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NATIONAL HISTORICAL ARCHIVES



A Restoration of *Nototherium mitchelli*.  
A Tasmanian Marsupial Rhinoceros of the Pleistocene era.

A Synopsis of the Vertebrate  
**Animals of Tasmania**

BY

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OLDHAM, BEDDOME & MEREDITH

HOBART



## PREFACE

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The need for a comprehensive list of the Tasmanian vertebrates has long been felt, and in presenting the following compilation we hope that it will prove of use, as well as serving to induce further study of the interesting animals of our island State.

We are well aware of the many shortcomings of the present work, but numerous difficulties have had to be overcome. Time had to be found in the evening hours, after the routine work of the day was over, for gathering together the necessary data and placing it in sequence, whilst parts have been written in bush camps, or aboard small yachts whilst on collecting trips round the coasts. Even after the work was completed, text figures drawn, etc., further difficulties presented themselves, as one of us had to be mainly responsible with regard to the cost of publication. Our task has not been easy, therefore, and we hope that the shortcomings may be excused and the compilation accepted in the spirit in which it was written, namely, as a sincere endeavour to assist students of natural history, and in particular to draw attention to the interesting fauna of Tasmania.

We wish to record our acknowledgements to the various authorities whose works have been consulted, and we have endeavoured to show this under the heading of "references" where they occur. We also desire to thank our many friends who assisted us in various ways.

CLIVE LORD.  
H. H. SCOTT.

April, 1924.



# INTRODUCTION

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Tasmania, an irregular heart-shaped island situated to the south of Australia between parallels 40deg. 40min. and 43deg. 39min. south, and between meridians 140deg. 30min. and 148deg. 30min. east, contains 26,215 square miles of country, being therefore nearly as large as Scotland, most of which is mountainous.

Several adjacent islands are also grouped with Tasmania. In past geological ages, and in even recent geological times, Tasmania was connected with Australia; but the formation of Bass Straits severed the connection, in the topographical sense. The dusky Aborigines were therefore left undisturbed until the advent of the white man, and the primitive customs of this now extinct race are of great scientific interest. Many of our animals are unique, and not only evoked the wonder of the sailors of the early exploring vessels, but at the present day still present features of absorbing interest to the scientist.

Before proceeding to consider the various species in detail, it may be as well to refer, as briefly as possible, to the position of Tasmania from a Zoogeographical standpoint. There have been several proposals made for dividing the world into realms which contain animals of similar characteristics. In all the proposed divisions one fact stands prominently forth, and that is that Australia and the adjacent islands occupy a unique position. Apart from certain parts of America, where the true opossum and a small marsupial rat occur, the Australian zone is the only region in which marsupials survive to the present day. It is the home of many types that show primitive characteristics, and some species are living in the Australian region that are only found in a fossil state in other parts of the world. For this reason Australia is often referred to as the "Fossil Continent."

The chief realms may be classified as follows:—

- i. Notogæa, including Tasmania, Australia, New Guinea and the adjacent islands.
- ii. Neogæa includes Central and South America.
- iii. Arctogæa includes the rest of the world.

These realms can be further divided into regions, but the only one we are concerned with in the present instance is the Australian region; for it must be remembered that the formation of Bass Straits is of but recent origin, geologically considered, and the fauna of Tasmania is intimately interwoven with that of the mainland, and, further, shows evidence of having been connected at some time in the past with that of South America. This, of course, raises the question of the Antarctic Continent, a vast land bridge between Australia and America which is assumed by many authorities to have existed in past ages.

In the present age, however, as far as mammals are concerned, the Notogæic realm is distinct from the remainder, in view of the fact that it is the home of the Monotremes and diprotodont marsupials. In the past it has been the realm of

giant marsupials, such as the marsupial rhinoceros, *Nototherium mitchelli*, and allied creatures. These latter, however, have now disappeared, in much the same manner as the mammoth and other large animals of the Old World. The fact to be noted, however, is that they were marsupials. It is largely owing to the fact that the marsupials have developed to such an extent in the Notogæan realm that Australia and Tasmania occupy such a unique position from a zoogeographical standpoint. The proportion of placental mammals is extremely small in Tasmania and the rest of the Australian zone, whereas in other parts of the world this section constitutes by far the largest group. The marsupials have taken on diverse methods of life. From burrowing, as the wombats do, to volplaning from tree to tree, which is the characteristic method of progression of the so-called flying opossum.

Tasmania's supposed connection with South America at some remote geological period has been referred to previously, and we will now return to this subject for a few moments. In doing so it must be remembered that the distribution of animals does not depend so much upon distance as upon land connection. Provided the land connection exists, and provides material for sustaining life, the distribution of species will follow as a matter of course over great areas. In Tasmania one of our most unique animals is the Thylacine, or Marsupial Wolf (often referred to as the Tasmanian "Tiger"). Our island is the only place in the world where this species is living to-day. It has long become extinct on the mainland. That the Thylacine, or a closely allied species, once lived in Australia is known from the fact that fossil bones relating to it have been found in several localities. The only other part of the world where traces of a like animal have been found is in the Middle Tertiary deposits of the Santa Cruz district of Patagonia. Here fossil remains have been met with that closely approach the animal which lives in Tasmania to-day. One of the points of difference lies in the fact that the premolars of the extinct South American animal are much closer together than are the premolars of our Tasmanian form. The differences are not great, however, and the name *Prothylacinus* has been given to the American representative. Although *Prothylacinus* is now extinct, there are living representatives which serve to add to the evidence in favour of some connection in the remote days of the past. The nearest living relatives of such Tasmanian forms as *Thylacinus* are to be found in the true opossums of South and Central America, which are carnivorous marsupials. Apart from the scientific, there is the economic value of our fauna. With proper regulations our animals can be made a permanent national asset, and the improvements made during the last few years as regards fauna protection are of national importance. Owing to excessive hunting in the past, the State has lost nearly all the benefits of the whale and seal fisheries. It behoves us to see that other sections do not share the same fate. It may be mentioned that during the last open season the following furred animals were trapped.—

Brush Phalangers ("Opossums")	..	..	105,968
Ringtail Phalangers ("Opossums")	..	..	587,179
Bennett's Wallaby ("Kangaroo")	..	..	146,236
Scrub Wallaby	..	..	201,365

With regard to the bird life of the island, this cannot be strictly considered as being plentiful, as far as mere numbers go. The introduction of such harmful species as the sparrow, starling, etc., and their great increase in numbers, is the cause of many of our native birds being driven from their nesting and feeding



haunts. The gun, snare, poison cart, the small boy, and, above all, the domestic cat, have done much to reduce our bird population. The pests and insects which these species feed upon are allowed to increase, and cause orchardists and others to spend hundreds of pounds every year in order to carry out, by means of artificial sprays, etc., the work which the birds formerly did.

Our reptiles are few in number as regards species, but many of those which occur in the island are abundant as individuals. Small lizards, for instance, are common from sea shore to mountain top.

Our fishes naturally represent the Southern inhabitants of the Australian zone, and are therefore of much scientific interest. Many problems in regard to their economy and migrations are awaiting the attention of students.

The scientific and economic value of our vertebrates in general merit far more attention than has been given it in the past.



# SYSTEMATIC

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Phylum *CHORDATA* (possessing a notochord).

Sub-phylum *CEPHALOCHORDATA* (Lancelets).

No skeleton, and without brains or limbs.

Sub-phylum *VERTEBRATA* (Vertebrates).

An internal skeleton of bone or cartilage and well developed brain.

Class *CYCLOSTOMATA* (Lampreys)

Fish-like, cold-blooded vertebrates, without limbs, a suction mouth in place of jaws.

Class *PISCES* (Fishes).

Cold-blooded vertebrates living in water, and breathing by means of gills, oviparous (with few exceptions).

Sub-Class *ELASMOBRANCHII* (Sharks and Rays).

Cartilaginous fishes, without an air bladder.

Sub-Class *TELEOSTOMI* (Bony Fishes).

Fishes with a bony skeleton.

Class *AMPHIBIA* (Frogs, &c.).

Cold-blooded vertebrates, which in the early stages of their life breathe by means of gills, and when adult by means of lungs. Young hatched from spawn (eggs without shells).

Class *REPTILIA* (Reptiles).

Cold-blooded vertebrates breathing air by means of lungs. Skin usually covered with scales. Skull jointed to backbone by one condyle. Viviparous and oviparous; when the latter the eggs have stout coverings.

Order *Ophidia* (Snakes).

Order *Lacertilia* (Lizards).

Class *AVES* (Birds).

Warm-blooded vertebrates breathing air by means of lungs. Body usually covered with feathers, and with well-developed wings suitable for flight. Oviparous. Eggs with hard shells.

Class *MAMMALIA* (Mammals).

Warm-blooded vertebrates, breathing air by means of lungs. Skin more or less hairy. Skull jointed to backbone by means of two condyles. Eggs minute, developing within female, which possesses milk glands for nourishment of young (except in Monotremes).

Sub-Class *MONOTREMATA* or *PROTOTHERIA* (Monotremes).

Order *Monotremata* (Monotremes).

Sub-Class *MARSUPALIA* or *METATHERIA* (Marsupials).

Order *Marsupialia* (Marsupials).

Sub-Class *PLACENTALIA* or *EUTHERIA* (Placental Mammals).

Order *Cetacea* (Whales and Dolphins).

Order *Rodentia* (Rodents).

Order *Carnivora* (Seals, &c.).

Order *Chiroptera* (Bats).

Order *Primates* (Man, &c.).

## THE FISHES OF TASMANIA

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Considerable research yet needs to be done before a really comprehensive list of the Fishes of Tasmania can be completed, and also one which will deal with the habits and economy of the various species. The West Coast of Tasmania, for instance, offers a great field for investigation. It is not within the scope of the present work to deal in detail with the economy of the various species and their commercial value, nor is it possible to deal with the magnificent work done in stocking our lakes and rivers with the *Salmonidæ* of the Old World. Such work as this, together with the commercial aspect of our sea fisheries, is awaiting attention. It is hoped that the present synopsis may prove a starting point towards its compilation.

Before proceeding with the synopsis of each species it may be of assistance to students if certain generalities as regards the structure and form of fishes are drawn attention to.

Fishes, in short, are cold-blooded vertebrates, with their structure adapted for living in water. Their form is subject to considerable variation, but their bodies may be divided as follows:—(1) the head, (2) the trunk, (3) the tail, and (4) the fins, the chief characters of the head being:—

Snout—The anterior portion above the mouth and below the eyes.

Interorbital space—The space between the eyes.

Nostrils—Which are situated in front of the eyes.

Occiput—The posterior portion of the head.

Gill opening—The opening leading to the gills.

Gill cover—The long flap covering the gills, and consisting of the pre-operculum, the operculum, sub-operculum.

Branchiostegals—The rays supporting the gill openings.

Pre-maxillary—The upper anterior bone of the mouth.

Maxillary—The bone adjoining the pre-maxillary.

Mandible—The bone of the lower jaw.

The trunk gradually merges into the tail, but in some cases there is a small finless portion, which is termed the caudal peduncle. The tail varies in shape to a considerable extent among the various species.

The lateral line is the line of pierced scales which occurs in most species, forming a line along the side of the trunk.

The fins are divided into paired and unpaired fins. Certain of them may be present or absent, and it is on their presence, position, shape and form that much of the classification of fishes depend.

Dorsal fin (D)—Situated on the dorsal or back.

Adipose dorsal—A small, fatty protuberance present in some species.

Anal fin (A)—Situate in posterior position on ventral line.

Caudal fin (C)—The tail fin, which may be one of various shapes, such as with the outer margin deeply notched (forked or furcate), concave (emarginate), convex (rounded), or straight (truncate).

Ventral fins—Paired fins on the ventral surface.

Pectoral fins—Paired fins situated on side near shoulder.

Fins differ considerably in structure; for instance, each or portion of each, may be either spinous, that is having the rays composed of spines or soft, in which cases the rays are often branched.

The scales also form a means of classification. In the present instance it will be sufficient to mention the two chief classes, namely, (1) *Cycloid*, which have the posterior margins unbroken, and usually with a concentric striation; (2) *Ctenoid* scales which have a toothed posterior margin.

Legend:—Ch., Cheek; Preo., Preopercle; Oper., Opercle; P. f., Pectoral Fin; V. f., Ventral Fin; A. f., Anal Fin; D. f., Dorsal Fin; Cd. f., Caudal Fin.

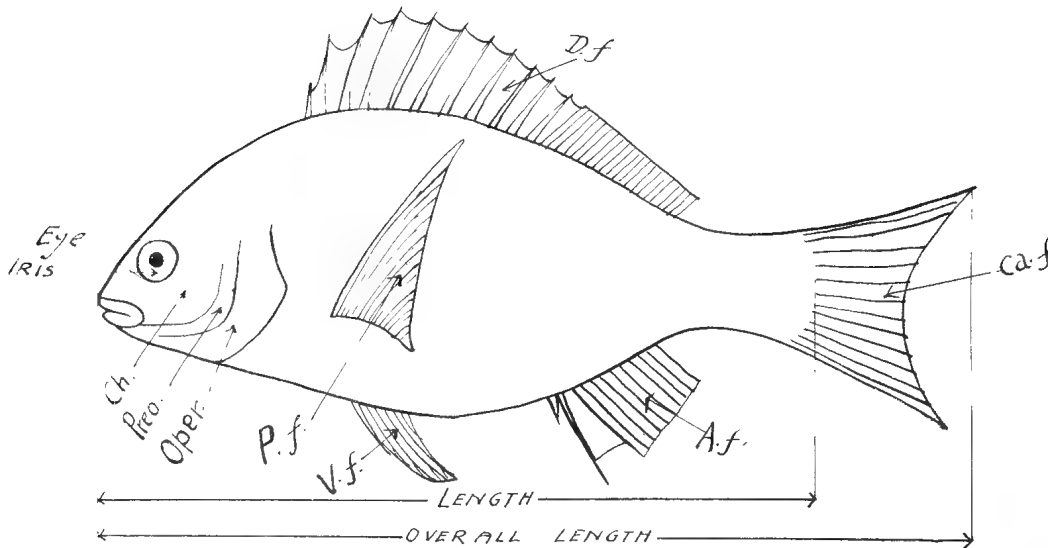


Diagram showing principal parts of a Fish.

# FISHES AND FISH-LIKE VERTEBRATES

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Sub-phylum *CEPHALOCHORDATA (ACRANIA)*.—Lancelets.

Family *BRANCHIOSTOMIDÆ*.

*Epigonichthys bassanus*, Gunther.—The Lancelet.

Sub-phylum *CRANIATA* (Lampreys, Fishes, and Higher Vertebrates).

Class *CYCLOSTOMATA*.

Family *MORDACIIDÆ*.

*Mordacia mordax*, Rich.—Short-headed Lamprey.

*Geotria australis*, Gray.—Pouched Lamprey.

Class *PISCES* (Fishes).

Sub-Class *ELASMOBRANCHII* (Sharks and Rays.)

Order *SELACHII* (Sharks).

Family *HEXANCHIDÆ*.

*Notorhynchus pectorosus*, Garman.—Seven-gilled Shark.

*Heptanchias perlo*, Bonn.—One-Finned Shark.

Family *HETERODONTIDÆ*.

*Heterodontus philippi*, B. & S.—Bull-headed or Port Jackson Shark.

*Gypropleurodus galeatus*, Gunther.—Crested Port Jackson Shark.

Family *CARCHARHINIDÆ*.

*Prionace glauca*, Linn.—Blue Shark.

*Galeorhinus australis*, Macleay.—School Shark.

Family *MUSTELIDÆ*.

*Mustelus antarcticus*, Gunther.—Gummy Shark.

Family *SPHYRNIIDÆ*.

*Sphyrna zygaena*, Linn.—Hammer Headed Shark.

Family *ORECTOLOBIIDÆ*.

*Orectolobus maculatus*, Bonn.—Wobbegong.

*Parascyllium collare*, Rams & Ogl.—Collared Cat Shark.

*Parascyllium variolatum*, Dum.—Varied Cat Shark.

Family *SCYLLIORHINIDÆ*.

*Halaehurus analis*, Ogilby.—Spotted Cat Shark.

*Cephaloscyllium isabella*, Dumeril.—Swell Shark.

Family *ALOPIIDÆ*.

*Alopias vulpinus*, Bonn.—Thresher Shark.

## Family CARCHARIIDÆ.

*Carcharius arenarius*, Ogilby.—Long-toothed Shark.

## Family ISURIDÆ.

*Isurus glaucus*, M. & H.—Blue Pointer.

## Family SQUALIDÆ.

*Squalus megalops*, Macleay.—Piked Dogfish.

*Squalus fernandinus*, Molina.—Spotted Dogfish.

*Oxyotus brunienensis*, Ogilby.—Prickly Dogfish.

## Family PRISTIOPHORIDÆ.

*Pristiophorus cirratus*, Latham.—Saw Shark.

*Pristiophorus nudipinnis*, Gunther.—Saw Shark.

## Family SQUATINIDÆ.

*Squatina australis*, Regan.—Angel Shark.

## Order BATOIDEI (Rays).

## Family RHINOBATIDÆ.

*Trygonorrhina fasciata*, M. & H.—Fiddler.

## Family NARCOBATIDÆ.

*Narcine tasmaniensis*, Rich.—Tas. Numbfish.

## Family RAJIDÆ.

*Raja nitida*, Gunther.—Rough Backed Skate.

*Raja lemprieri*, Rich.—Thorn Back Skate.

## Family DASYATIDÆ.

*Dasyatis brevicaudatus*, Hutton.—Short-tailed Stingaree.

*Urolophus cruciatus*, Lacep.—Banded Stingaree.

*Urolophus viridis*, McCulloch.—Green-backed Stingaree.

*Urolophus bucculentus*, Macleay.—Sandy-backed Stingaree.

## Family MYLIOBATIDÆ.

*Myliobatis australis*, Macleay.—Eagle or Whiptail Ray.

## Family CHIMÆRIDÆ.

*Chimaera ogilbyi*, Waite.—Ghost Shark.

## Family CALLORHYNCHIDÆ.

*Callorhynchus millii*, Bory.—The Elephant Fish.

## Sub-Class TELEOSTOMI (Bony Fishes.)

## Order ISOSPONDYLI (Herrings and Trout-like Fishes).

## Family ENGRAULIDÆ.

*Engraulis australis*, Shaw.—Australian Anchovy.



## Family CLUPEIDÆ.

*Clupea bassensis*, McCull.—Australian Sprat.  
*Stolephorus robustus*, Ogilby.—Blue Sprat.  
*Sardinia neopilchardus*, Steindachner.—Australian Pilchard.

## Family GONORHYNCHIDÆ.

*Gonorhynchus greyi*, Rich.—Beaked Salmon.

## Family GALAXIIDÆ.

*Galaxias attenuatus*, Jenys.—Jollytail.  
*Galaxias weedoni*, Johnston.—The Mersey Jollytail.  
*Galaxias truttaceus*, Cuv. & Val.—Spotted Mountain Trout.  
*Galaxias auratus*, Johnston.—Lake Trout.

## Family SALMONIDÆ.

Introduced species of *Salmonidæ*.

*Salmo salar*, Linn.—Salmon.  
*Salmo fario*, Linn.—Brown Trout.  
*Salmo irideus*, Gibbons.—Rainbow Trout.  
*Salmo levenensis*.—Loch Leven Trout.  
*Salmo trutta*.—Salmon Trout.  
*Salmo fontinalis*.—American Brook Trout.  
*Salmo sebago*.—Sebago Salmon.  
*Onchorhynchus nerka*.—Sockeyed Salmon.  
*Onchorhynchus quinnat*.—Quinnat Salmon.

## Family ARGENTINIDÆ.

*Argentina elongata*, Hutton.—Argentine (Siel Smelt).

## Family ALOCHITONIDÆ.

*Prototroctes maraena*, Gunther.—Australian Grayling (Cucumber Herring).  
*Lovettia sealii*, Johnston.

## Family RETROPINNIDÆ.

*Retropinna tasmanica*, McCulloch.—Tasmanian Smelt ("Whitebait").

Order *INIOMI* (Cucumber Fish, &c.).

## Family SUDIDÆ.

*Chlorophthalmus nigripinnis*, Gunther.—Cucumber Fish.

## Family ALEPISAUROIDÆ.

*Alepisaurus ferox*, Lowe.—Lancet Fish.

Order *OSTARIOPHYSI* (Introduced).

## Family CYPRINIDÆ.

*Carassius carassius*, Linn.—European Carp.  
*Carassius auratus*, Linn.—Gold Fish.  
*Tinca tinca*, Linn.—English Tench.

Order *SYMBRANCHII* (Pigmy Eels).

## Family CHEILOBRANCHIIDÆ.

*Cheilobranchus rufus*, Macleay.—Red Banded Shore Eel.  
*Cheilobranchus dorsalis*, Rich.—Striped Brown Shore Eel.

Order *APODES* (Eels).Family *ANGUILLIDÆ*.*Anguilla australis*, Rich.—Short-finned Eel.*Anguilla reinhardtii*, Sldr.—Long-finned Eel.Family *LEPTOCEPHALIDÆ*.*Leptocephalus conger*, Linn.—Common Conger Eel.*Leptocephalus wilsoni*, Castel.—Conger Eel.*Congermuraena habenata*, Rich.—Little Conger Eel (Silver Eel of Tas.).Family *ECHELIDÆ*.*Muraenichthys tasmanicus*, McCull.—Tasmanian Worm Eel.*Muraenichthys breviceps*, Gunther.—Short-headed Eel.Family *OPHICHTHYIDÆ*.*Ophisurus serpens*, Linn.—Snake Eel.Family *MACRORHAMPHOSIDÆ*.*Macrorhamphosus elevatus*, Waite.—Bellows Fish.*Centriscops humerosus*, Rich.—Bellows Fish.*Notopogon biliei*, Regan.—Bellows Fish.Family *LAMPRIDIDÆ*.*Lampris luna*, Gunther.—Opah.Family *SYNGNATHIDÆ*.*Corythoichthys philipi*, Lucas.—Pipefish.*Urocampus carinirostris*, Castelnau.—Pipefish.*Stigmatopora argus*, Rich.—Pipefish.*Stigmatopora nigra*, Kaup.—Pipefish.*Leptonotus semistriatus*, Kaup.—Pipefish.*Solegnathus spinosissimus*, Gunther.—Pipefish.*Solegnathus fasciatus*, Gunther.—Sea Horse.*Histiogamphelus briggsi*, McCulloch.—Pipefish.*Phyllopteryx foliatus*, Shaw.—Leafy Sea Horse.*Hippocampus abdominalis*, Lesson.—Sea Horse.*Hippocampus breviceps*, Peters.—Sea Horse.Order *HYPOSTOMIDES* (Dragon Fish).Family *PEGASIDÆ*.*Acanthopegasus lancifer*, Kaup.—Dragon Fish.Order *SYNENTOGNATHI* (Garfish, etc.).Family *SCOMBRESCOCIDÆ*.*Scombrocox fosteri*, Cuv. & Val.—Billfish.Family *HEMIRHAMPHIDÆ*.*Hemirhamphus intermedius*, Cantor.—Sea Garfish.Order *ANACANTHINI* (Whiptails, &c.).Family *GADIDÆ*.*Lotella callarias*, Gunther.—Small Scaled Rock Cod ("Beardie").*Physiculus barbatus*, Gunther.—Common Rock Cod.*Physiculus bachus*, Forster.—Red Rock Cod.

## Family CORYPHÆNOIDIDÆ.

*Coelorhynchus australis*, Rich.—Genadier or Whiptail.  
*Macruronus novæ-zealandiæ*, Hector.—Whiptail.  
*Optonurus denticulatus*, Rich.—Deep Sea Whiptail.

## Order BERYCOMORPHI (Nannygai, &amp;c.).

## Family TRACHICHTHYIDÆ.

*Trachichthodes affinis*, Gunther.—Nannygai, &c.  
*Trachichthys australis*, Shaw.  
*Paratrachichthys trilli*, Hutton.—Sandpaper Fish.

## Family ZEIDÆ.

*Zeus faber*, Linn.—John Dory.  
*Zenopsis nebulosus*, Schleg.—Mirror Dory.  
*Cyttus novæ-zealandiæ*, Arthur.—Silver Dory.  
*Cyttus australis*, Rich.—Silver Dory.

## Order ALLOTRIognathi (Ribbon Fishes).

## Family REGALECIDÆ.

*Regalecus glesne*, Ascanius.—The Oar Fish.

## Family TRACHYPTERIDÆ.

*Trachipterus altivelis*, Kner.—Ribbon Fish.

## Family LOPHOTIDÆ.

*Lophotes guntheri*, Johnston.—Lophotes.

## Order HETEROSOMATA (Flounders, &amp;c.).

## Family BOTHIDÆ.

*Pseudorhombus multimaculatus*, Gunther.—Small-toothed Flounder.  
*Pseudorhombus tenuirastrum*, Waite.—Deepwater Flounder.  
*Lophonectes gallus*, Gunther.—Crested Flounder.

## Family PLEURONECTIDÆ.

*Ammotretis rostratus*, Gunther.—Long-snouted Flounder ("Sole" of Tas.).  
*Ammotretis tudori*, McCulloch.—Flounder.  
*Ammotretis macrolepis*, McCulloch.—Flounder.  
*Rhombosolea flesoides*, Gunther.—Southern Flounder.  
*Rhombosolea tapirina*, Gunther.—Flounder.

## Family CYNOGLOSSIDÆ.

*Paraplagusia unicolor*.—Tongue or Lemon Sole.

## Sub-order MUGILOIDEA.

## Family MUGILIDÆ.

*Mugil cephalus*, Linn.—Sea Mullet.  
*Myxus elongatus*, Gunther.—Sand Mullet (Tallegallane of N.S.W.).  
*Agonostomus fosteri*, Cuv. & Val.—Yellow-eyed Mullet.

## Family ATHERINIDÆ.

- Atherina microstoma*, Gunther.—Large-scaled Silver Fish.  
*Atherina dannevigii*, McCulloch.—Dannevig's Silver Fish.  
*Atherina presbyteroides*, Rich.—Silver Fish.  
*Atherina hepsetoides*, Rich.—Silver Fish.  
*Atherina hepsetus*, Linn.—Silver Fish.  
*Atherina tamarensis*, Johnston.—Silver Fish.  
*Atherina jacksoniana*, Quoy & Gaim.—Silver Fish.

## Family SPIRYRÆNIDÆ.

- Sphyræna nova-hollandia*, Gunther.—Short-finned Sea Pike (Snook)

## Sub-order STROMATEOIDEA.

## Family STROMATEIDÆ.

- Serirolella brama*, Gunther.—Snotgall Trevally.  
*Serirolella punctata*, Forster.—Spotted Trevally.  
*Serirolella debula*, Gunther.—Mackerel Trevally.  
*Hyperoglyphe johnstoni*, Morton.—Deep Water Trevally.

## Sub-order PERCOIDEA.

## Family PERCIDÆ.

- Perca fluviatilis*, Rondel.—English River Perch (Intro.).

## Family SERRANIDÆ.

- Polyprion oxygencios*, Bloch & Schneider.—Hapuku (of N.Z.).  
*Callanthias allporti*, Gunther.—Allport's Perch.  
*Cæsioperca lepidoptera*, Forster.—Red Butterfly Perch.  
*Cæsioperca rasor*, Rich.—Red Perch or Tasmanian Barber.  
*Percolates colonorum*, Gunther.—Brakish-water Perch.  
*Nannoperca tasmaniae*, Johnston.—Fresh Water Perch.

## Family PLESIOPIDÆ.

- Trachinops caudomaculatus*, McCoy.—Blotched Tailed Trachinops.

## Family APOGONIDÆ.

- Apogon fasciatus*, Shaw.—Soldier Fish (of N.S.W.).  
*Apogon novæ-hollandia*, Val.  
*Apogon lemprieri*, Johnston.  
*Dinolestes lewini*, Griff.—Long-finned Sea Pike.

## Family OPLEGNATHIDÆ.

- Ophognathus conwayi*, Rich.

## Family SILLAGINIDÆ.

- Sillaginodes punctatus*, Cuv. & Val.—Spotted Whiting.  
*Sillago maculata*, Quoy & Gaim.—Trumpeter Whiting.  
*Sillago bassensis*, Cuv. & Val.—School Whiting.

## Family POMATOMIDÆ.

- Pomatomus saltatrix*, Linn.—Tailor or Skipjack.

## Family CARANGIDÆ.

- Trachurus declivis*, Jenvns.—Scad ("Yellow Tail" of N.S.W.).  
*Trachurus novæ-zelandiæ*, Rich.—Horse Mackerel of Tas. & N.Z. (Cowan-young of N.S.W.).

*Caranx georgianus*, Cuv. & Val.—Silver Trevally.

*Naucrates ductor*, Linn.—Pilot Fish.

*Seriola grandis*, Castel.—Tas. Yellow Tail ("Kingfish" of N.S.W.).

Family ARRIPIDIDÆ.

*Arripis trutta*, B. & S.—Australian Salmon (Native Salmon).

Family ERYTHRICHTHYIDÆ.

*Emmelichthys nitidus*, Rich.—Pearl Fish.

Family SCIÆNIDÆ.

*Sciæna antarctica*, Castelnau.—Jew Fish (of N.S.W.), Dew Fish (of Queensland), King Fish (of Vic. & W.A.), Butter Fish (of S.A.).

Family MULLIDÆ.

*Upeneichthys porosus*, Cuv. & Val.—Blue-striped Red Mullet.

Family SPARIDÆ.

*Pagrosomus auratus*, B. & S.—Snapper.

*Sparus australis*, Gunther.—Silver Bream of Tas. (Black Bream of N.S.W.).

Family GIRELLIDÆ.

*Girella tricuspidata*, Q. & G.—Black Bream of Tas.

Family PEMPHERIDÆ.

*Liopempheris multiradiata*, Klun.—Big-scaled Bullseye.

*Parapriacanthus elongata*, McCulloch.—Elongated Bullseye.

Family SCORPIDIDÆ.

*Scorpiis georgianus*, Cuv. & Val.—Sweep.

Family CHÆTODONTIDÆ.

*Vinculum sexfasciatum*, Rich.—Six-banded Coral Fish ("Moonlighter").

Family ENOPLOSIDÆ.

*Enoplosus armatus*, Shaw.—Old Wife.

Family HISTIOPTERIDÆ.

*Paristiopterus labiosus*, Gunther.—Giant Boar Fish.

*Zanclistius elevatus*, Rams & Og.—Short Boar Fish.

*Pentaceropsis recurvirostris*, Rich.—Long-snouted Boar Fish.

Family APOLODACTYLIDÆ.

*Dactylosargus arctidens*, Rich.—Marbled Kelp Fish.

Family CHIRONEMIDÆ.

*Chironemus marmoratus*, Gunther.—Large Kelp Fish.

Family CHEILODACTYLIDÆ.

*Dactylopagrus macropterus*, B. & S.—Black and Silver Perch.

*Dactylopagrus morwong*, R. & O.—Morwong (Great Perch of Tas.).

*Dactylophora nigricans*, Rich.—Dusky Morwong (Butter Perch).

*Goniistius vizonarius*, Kent.—Magpie Perch.  
*Cheilodactylus spectabilis*, Hutton.—Carp of Tasmania (Brown-banded Morwong of N.S.W.).

Family LATRIDIDÆ.

*Latris lineata*, B. & S.—Real Trumpeter ("Stripey").  
*Latridopsis forsteri*, Castelnau.—Bastard Trumpeter.  
*Latridopsis ciliaris*, Forster.—Bastard Trumpeter.  
*Mendosoma allporti*, Johnston.—Real Bastard Trumpeter.

Family POMACENTRIDÆ.

*Glyphidodon victoriae*, Gunther.—Rock Perch.

Family LABRIDÆ.

*Pseudolabrus tetricus*, Rich.—Lilac-banded Parrot Fish.  
*Pseudolabrus psittaculus*, Rich.—Rosy Parrot Fish.  
*Pseudolabrus celidotus*, Rich.—Parrot Fish.  
*Pseudolabrus furicula*, Rich.—Purple Parrot Fish.  
*Pictilabrus latilavus*, Rich.—Green-banded Parrot Fish.  
*Achaerodus gouldii*, Rich.—Groper.  
*Verreo oxycephalus*, Bleeker.—Pig Fish.

Family NEOODACIDÆ.

*Neoodax semifasciatus*, Cuv. & Val.—Rock Whiting ("Stranger").  
*Neoodax balteatus*, Cuv. & Val.—Little Rock Whiting ("Ground Mullet").  
*Neoodax beddomei*, Johnston.—Pigmy Rock Whiting.  
*Olisthops cyanomelas*, Rich.—Herring Cale.

Family GADOPSIDÆ.

*Gadopsis marmoratus*, Rich.—River Blackfish.

Family PINGUIPEDIDÆ.

*Parapercis allporti*, Gunther.—Barred Grub Fish.

Family URANOSCOPIDÆ.

*Kathetostoma læve*, Bl.—Catfish (Stonelifter).

Family BOVICHTHIDÆ.

*Pseudaphritis urvillii*, Cuv. & Val.—Freshwater Flathead or Sandy.  
*Bovictus variegatus*, Cuv. & Val.—Dragonet.

Family CALLIONYMIIDÆ.

*Callionymus papilio*, Gunther.—Painted Dragonet.

Family SCOMBRIDÆ.

*Scomber australasicus*, Cuv. & Val.—Mackerel.  
*Gasterochisma melampus*, Rich.—Butterfly Fish.  
*Auxis thazard*, Lacep.—Frigate Mackerel.  
*Thunnus maccoyi*, Castel.—Southern Tunny.  
*Sarda chilensis*, Cuv. & Val.—Horse Mackerel.

Family ISTIOPHORIDÆ.

*Tetrapturus indicus*, Guv. & Val.—Sword Fish.

## Family TRICHIURIDÆ.

*Lepidopus caudatus*, Euph.—Frost Fish.

## Family GEMPYLIDÆ.

*Jordanidia solandri*, Synder.—King Barrcoutha.  
*Thyrsites atun*, Euph.—Barracoutha.

## Family GOBIIDÆ.

*Gobius tamarensis*, Johnston.—Tamar Goby.  
*Gobius lateralis*, Macleay.—Spotted Goby.  
*Gobius hinsbyi*, McCull & Ogilby.—Girdled Goby.

## Family BLENNIIDÆ.

*Blennius tasmanianus*, Rich.—Blenny or Bully.  
*Clinus perspicillatus*, Cuv. & Val.—Eyed Blenny.  
*Clinus johnstoni*, Saville Kent.—Johnston's Blenny.  
*Cristiceps australis*, Cuv. & Val.—Weed Fish.  
*Cristiceps forsteri*, Castel.—Forster's Blenny.  
*Gillias clarkiei*, Morton.—Clark's Blenny.

## Sub-order OPHIDIOIDEA.

## Family OPHIDIIDÆ.

*Genypterus blacodes*, B. & S.—Ling.

## Order DISCOCEPHALI (Sucker Fish).

## Family ECHENEIDIDÆ.

*Echeneis naucrates*, Linn.—Slender Sucker Fish.  
*Remora remora*, Linn.—Short Sucker Fish.

## Order SCLEROPAREI (Gurnets, Flatheads, &amp;c.)

## Family SCORPÆNIDÆ.

*Scorpæna cruenta*, Rich.—Gurnet ("Red Rock Cod" of S.A. & N.S.W.).  
*Scorpæna cardinalis*, Rich.—Gurnet.  
*Neobastes scorpenoides*, Gulch.—Spotted Gurnet Perch.  
*Neobastes thetidis*.—Rough Gurnet Perch.  
*Neobastes panda*, Rich.—Gurnet.  
*Helicolenus percoides*, Rich.—Rock Gurnet.  
*Glyptauchen panduratus*, Rich.—Goblin Fish.  
*Centropogon australis*, Gunther.—Fortesque of N.S.W.  
*Pentaroqe marmorata*, Cuv. & Val.—Soldier.

## Family GNATHANACANTHIDÆ.

*Gnathanacanthus gætzeei*, Black.—Red Velvet Fish.

## Family PATÆCIDÆ.

*Patæcus maculatus*, Gunther.—Warty Prow Fish.

## Family TRIGLIDÆ.

*Lepidotrigla vanessa*, Rich.—Butterfly Gurnard.  
*Chelidonichthys kumu*, Lesson & Garnot.—Kumu Gurnard.  
*Pterogotrilla polyommata*, Rich.—Sharp-beaked Gurnard.

## Family HOPLICHTHYIDÆ.

*Hoplichthys haswelli*, McCulloch.—Spiny Flathead.

## Family PLATYCEPHALIDÆ.

*Platycephalus fuscus*, Cuv. & Val.—Dusky Flathead.  
*Platycephalus bassensis*, Cuv. & Val.—Common Tas. Flathead.  
*Platycephalus lævigatus*, Cuv. & Val.—Smooth Flathead.

## Order XENOPTERI (Cling Fishes).

## Family GOBIESOCIDÆ.

*Diplocrepis cardinalis*, Ramsay.—Cling Fish.  
*Aspasmogaster tasmaniensis*, Gunther.—Tas. Cling Fish.

## Order PEDICULATI (Angler Fishes).

## Family BATRACHOIDIDÆ.

*Pseudobatrachus dubius*, Shaw.—Frog Fish.

## Family ANTENNARIIDÆ.

*Histrio histrio*, Linn.—Marbled Angler.  
*Trichophryne mitchelli*, Morton.—Prickly Angler.

## Family BRACHIONICHTHYIDÆ.

*Brachionichthys hirsutus*, Lacep.—Hand Fish.  
*Brachionichthys politus*, Rich.—Red Hand Fish.

## Family OGCOCEPHALIDÆ.

*Halieutæa brevicauda*, Ogilby.—Spiny Frog Fish.

## Order PLETOGNATHI (Leather Jackets, &amp;c.).

## Family MONACANTHIDÆ.

*Cantherines hippocrepis*, Q. & Gaim.—Variable Leather Jacket.  
*Cantherines guntheri*, Macleay.—Tooth-brush Leather Jacket.  
*Cantherines spilomelanurus*, Q. & G.—Golden-eyed Leather Jacket.  
*Cantherines maculosus*, Rich.—Small Brown Leather Jacket.  
*Cantherines mosaicus*, Rams. & Ogl.—Mosaic Leather Jacket.  
*Cantherines melas*, Gunther.—Black Leather Jacket.  
*Cantherines gunni*, Gunther.—Dark Brown Leather Jacket.  
*Cantherines convexirostris*, Gunther.—Grey Leather Jacket.  
*Cantherines rudis*, Rich.—White-banded Leather Jacket.  
*Cantherines peronii*, Holland.—Pale Brown Leather Jacket.  
*Brachaluteres trossulus*, Rich.—Pigmy Leather Jacket.

## Family OSTRACIDÆ.

*Aracana aurita*, Shaw.—Striped Trunk Fish.  
*Aracana ornata*, Gray.—Yellow-striped Trunk Fish.



## Family TETRAODONTIDÆ.

*Spheroides hamiltoni*, Rich.—Toad Fish.

*Spheroides richi*, Frem.—Globe Fish.

## Family DIODONTIDÆ.

*Allomycterus jaculiferus*, Cuvier.—Porcupine Fish.

*Atopomycterus nychthemerus*, Cuv.—Slender-spined Porcupine Fish

## Family MOLIDÆ.

*Mola mola*, Linn.—Sun Fish.

## ACRANIA (Lancelets).

## SOUTHERN LANCELET.

*Epiqonichthys bassanus*, Gunther.

The Lancelet is a small marine animal occupying the lowest position in the Vertebrate-like class. Although not strictly a vertebrate, owing to its fish-like habits, it is usually grouped with the Fishes. The body is semi-transparent, 30-40 mm. long, elongate, compressed, scaleless and limbless. Brain; cranium and jaws wanting. Blood colourless. It passes most of its time burrowing in the sand.

## CRANIATA (Lampreys, Fishes and Higher Vertebrates).

## Class CYCLOSTOMATA (Lampreys).

Lampreys are cold-blooded vertebrates, without limbs or scales. The mouth lacks jaws, and is in the form of suckorial disc, by means of which they attach themselves to fishes, &c., and eat into the flesh by means of thin rasp-like teeth.

## SHORT-HEADED LAMPREY.

*Mordacia mordax*, Rich.

Body eel-like. Dorsal fins two, well separated, the second continuous with caudal. Mouth with surrounding suckorial disc, elliptic, with a free lip behind. Length, 400 mm ( $15\frac{3}{4}$  inches).

Reference—Richardson, Voy. Err. & Terr., p. 62, pl. 38.

## POUCHED LAMPREY.

*Geotria australis*, Gunther.

Dorsal fins two, the posterior separate from caudal fin. Distance between dorsal fins less than length of first. Gular pouch large. Colour, black. Length 455 mm (18 inches).

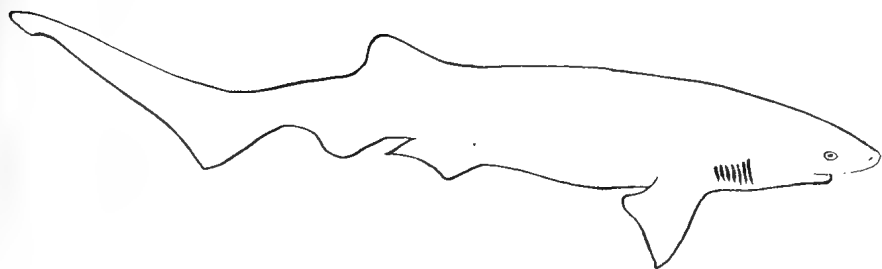
Reference—Gunther, P.Z.S., 1871, p. 675, pl. LXXX.

Class *ELASMOBRANCHII* (Sharks, Rays, and Ghost Sharks).

The Sharks and Rays are interesting owing to the fact that they do not possess a bony skeleton, the structure being cartilaginous, or partly calcified. They are found all over the world, and are of carnivorous habits. Most are viviparous, but certain species are oviparous, and these produce eggs with a horny covering, which are deposited on the sea floor, and there hatched out.

SEVEN-GILLED SHARK.

*Notorhynchus pectorosus*, Garman.



One dorsal fin, without spine, opposite to anal. Seven wide gill openings. Head broad, snout broadly rounded. A single median tooth in upper jaw. Colour uniform grey. Length up to 2745 mm (9 feet).

References—Macdonald & Barron, P.Z.S., 1868, p. 371, pl. XXXII. (*H. indicus*). McCulloch, "Endeavour" Scientific Results, 1911, I., p. 2, and pl. 1, fig. 1.

ONE-FINNED SHARK.

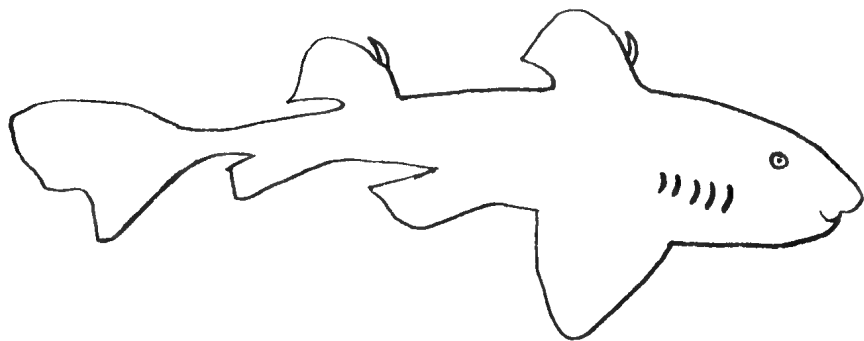
*Heptranchias perlo*, Bonn.

Somewhat similar to *N. pectorosus*. One dorsal fin, without spine, opposite to anal. Seven wide gill openings. Head narrow, snout pointed. No single tooth in upper jaw. Colour uniform grey.

References—McCulloch, "Endeavour Scientific Results, 1911, I., p. 2.

## BULL-HEADED SHARK

(Port Jackson Shark).

*Heterodontus philippi*, B. & S.

Head high, blunt and rounded, with ridge over eye, teeth modified to crushing plates. Two dorsal fins, each with small spine anteriorly. Pectorals large. Anal fin terminating at considerable distance from root of caudal. Supra-orbital ridges low. Colour, reddish-brown above, yellowish below, with two brown bands anterior to first dorsal, the first crossing the eyes. Length, 915-1220 mm. (3-4 feet).

References—Gunther, Brit. Mus. Cat. Fish VIII., p. 415. McCoy, Prod. Zoo. Vic., pl. 113.

The Port Jackson Shark is generally known in Tasmania as the Bull-headed Shark, on account of its peculiar shaped head. The teeth are very remarkable, as are also the egg cases, which are spiral in form.

## CRESTED PORT JACKSON SHARK.

*Gyropleurodus galeatus*, Gunther.

Two dorsals. Anal fin large, reaching to root of caudal. Supraorbital crests high.

References—Gunther, B.M. Cat. Fish VIII., p. 416.

Similar in appearance to the Port Jackson Shark, but differing in several specific characteristics, such as the supraorbital crests and position of anal fin. In addition, the spiral egg cases are adorned with long tendrils.

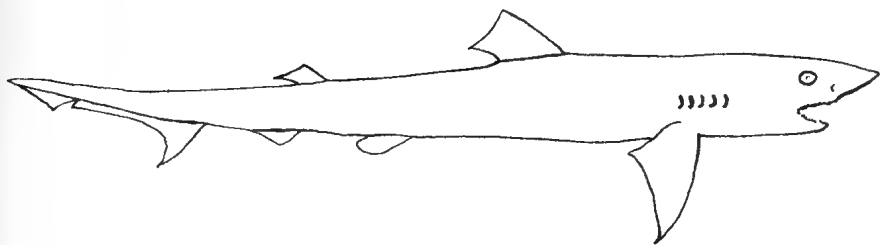
## BLUE SHARK.

*Prionace glauca*, Linn.

Snout produced. Pectoral fin long, falciform extending to dorsal. Caudal slender. First dorsal nearer the ventrals than pectorals. Length up to 4575 mm. (15 feet).

Reference—Gunther, B.M. Cat. VIII., p. 364.

## SCHOOL SHARK.

*Galeorhinus australis*, Macleay.

Head flattened with pointed muzzle. Anterior dorsal over interval between pectorals and ventrals, and twice the size of second dorsal. Colour, upper slate colour, fins darker, under white. Iris yellow. Length up to 1525 mm. (5 feet).

Reference—McCoy, Prod. Zoo., Vic., pl. 64, fig 2.

The School Shark is the Australian representative of the European "Tope," with which it is practically identical. It is a fairly common species.

## GUMMY SHARK.

(Australian Smooth Hound).

*Mustelus antarcticus*, Gunther.

Snout obtuse. First dorsal fin between pectorals and ventrals, without spine. Tail slightly elevated. Notch in distal lobe of caudal fin. Teeth blunt, crushing plates. Colour, upper ashy grey, under whitish. Length, 915-1220 mm. (3-4 feet).

Reference—McCoy, Prod. Zoo., Vic., pl. 87.

The Gummy Shark is a common form in Tasmanian waters. The teeth are reduced to crushing plates. Viviparous.

## WOBEGONG.

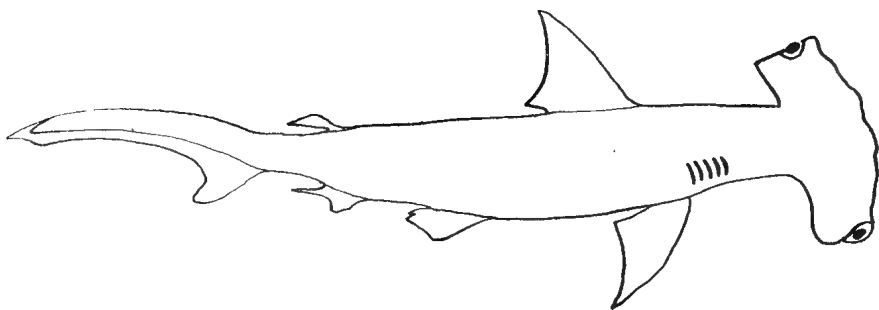
*Orectolobus maculatus*, Bonn.

Two dorsal fins, posteriorly situated. Teeth long. General colour brownish, with a number of more or less distinct marbled markings. Length, 1525 mm. (5 feet), occasionally larger.

Reference—McCoy, Prod. Zoo., Vic., pl. 43, fig 1.

The Wobegong, or, as it is occasionally called, the Carpet Shark, is a peculiar looking species, usually with a number of weed-like attachments around the mouth. Viviparous.

## HAMMER-HEADED SHARK.

*Sphyrna zygaena*, Linn.

Head broad and flattened laterally with two oblong lobes, at the outer edge of which the eyes are placed. Colour, upper brownish grey, under whitish. Length, up to 4575 mm. (15 feet).

Reference—McCoy, Prod. Zoo., Vic., pl. 56.

The Hammer-headed Shark is a peculiar looking species, easily identified on account of the shape of the head and position of the eyes. It is of a fierce disposition, but is not common in Tasmanian waters.

NATURAL HISTORY MUSEUM, MELBOURNE

## COLLARED CAT SHARK.

*Parascyllium collare*, Rams. & Og.

Two dorsal fins. Anal commencing before second dorsal. Colour, yellowish tinged brown, spotted, and banded with about eight bands. Under yellowish. Length, up to 915 mm. (3 feet).

Reference—Waite, Mem. Aust. Mus., 1899, p. 32, pl. 2.

## VARIED CAT SHARK.

*Parascyllium variolatum*, Dum.

Two dorsal fins, without spines. Colour, brown, more or less spotted. Dark spots in fins. Length, 610-915 (2-3 feet).

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 7, pl. 2, fig 1.

## SPOTTED CAT SHARK.

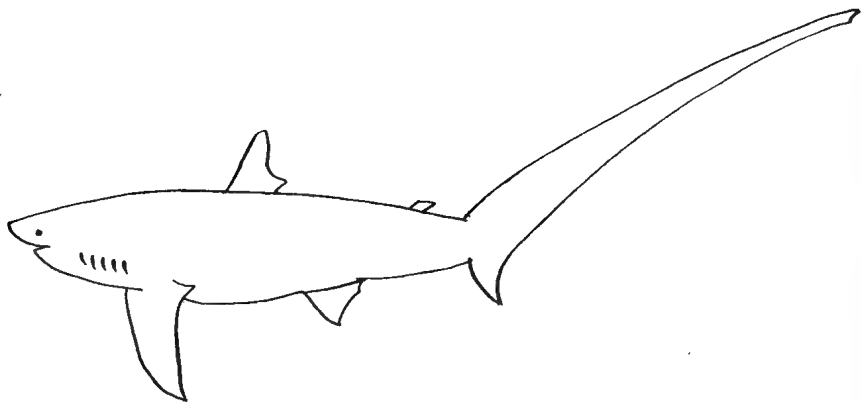
*Halaelurus analis*, Ogilby.

First dorsal equal to second. Ventrals in advance of first dorsal. Lower caudal lobe large. Colour, upper stone colour, blotched brown, under greyish white. Length, 610 mm. (2 feet).

References—Ogilby, P.I.S., N.S.W., 1885. p. 445. McCulloch, "Endeavour" Scientific Results, 1911, p. 3.

A deep water species obtained by trawlers in Bass Straits. This species was evidently recorded by Johnston as *Scyllium maculatum*, Bl. Oviparous.

## THRESHER SHARK.

*Alopias vulpinus*, Bonn.

Body cylindrical. Compressed laterally near tail, which merges into exceptionally long upper lobe of caudal. First dorsal high and triangular, second dorsal small. Colour, above grey, the sides mottled, and under surface white. Length, up to 4575 mm. (15 feet).

Reference—McCoy, Prod. Zoo., Vic., pl. 88.

The extraordinary development of the upper lobe of the caudal fin of this shark serves to identify it immediately. It is rare in Tasmanian waters, but individuals have been known to ascend the River Derwent. There is a specimen in the Tasmanian Museum, which was captured at Sandy Bay.

### SWELL SHARK.

*Cephaloscyllium isabella*, Bonn.

Head short, broad and depressed. First dorsal opposite to ventrals. Second opposite to anal. Pectorals very large. Colour, above brown, marked black, under whitish. Length, 915-1220 mm. (3-4 feet).

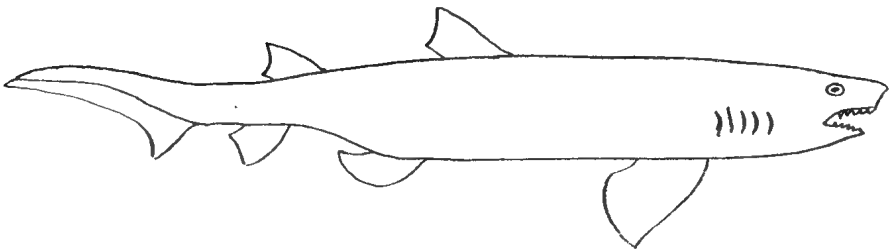
Reference—Waite, Trans. N.Z., Inst., 1909, XLII., p. 384. McCulloch, "Endeavour" Scientific Results, 1911, p. 6.

Recorded by McCulloch from East Coast of Flinders Island, Bass Straits.

### GREY SHARK.

(Long-toothed Shark).

*Carcharius arenarius*, Ogilby.



General form rounded. Snout flat, moderately pointed. Teeth in both jaws alike, long, sharp and awl-like. Two dorsal fins, both large. Colour, upper yellowish grey, under lighter. Length, up to 4270 mm. (14 feet).

Reference—McCoy, Prod. Zoo., Vic., plate 64, fig 1.

The Grey Nurse is also known as the Shovel-nosed or Long-toothed Shark. It is not uncommon in Tasmanian waters, but it does not appear to have the same fierce habits here as it does in the warmer waters of the mainland, where the species is said to readily attack bathers.





From a drawing by Mrs. Metcalf.

Illustrated by Percy Jackson, S. L. C. *H. leucophaea* photograph.

Tasmanian Museum

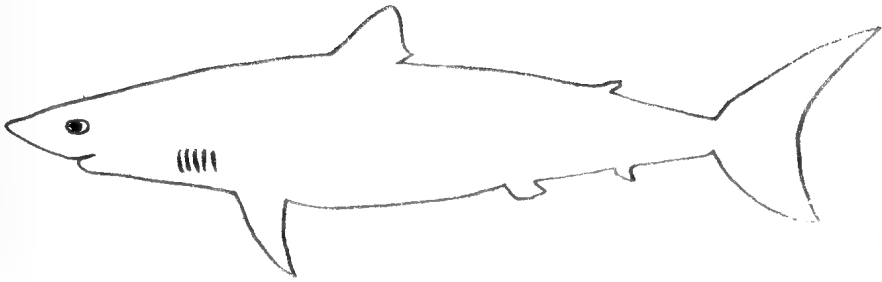


From a drawing by Mrs. Meredith

Long-lined 800 Pike (*Diploleistes lewini*).

Island Museum

## BLUE POINTER.

*Isurus glaucus*, M. & H.

Snout pointed. Teeth, thirteen on each side, long, lancet. Dorsal fin mid way between pectorals and ventrals. Length, up to 4270 mm. (14 feet).

Reference—Gunther, B.M. Cat. Fishes, VIII., pl. 391.

The Blue Pointer is fairly common. It was evidently this species which was recorded by Allport, and quoted by Johnston (1882, p. 138), as the Portbeagle or Blue Shark (*Lamna cornubica*, Flem). Do not confuse this species with the Blue Shark (*Prionace glauca*).

## PIKED DOGFISH.

*Squalus megalops*, Macleay.

Head flat. Snout long, tapering and rounded in front. Two dorsal fins, each with spine, no anal fin. Ventrals opposite middle of space between two dorsals. A conspicuous keel runs along each side of tail. Colour, greyish brown. Length, 610 mm. (2 feet).

Reference—Macleay, P.L.S., N.S.W., 1881, p. 367.

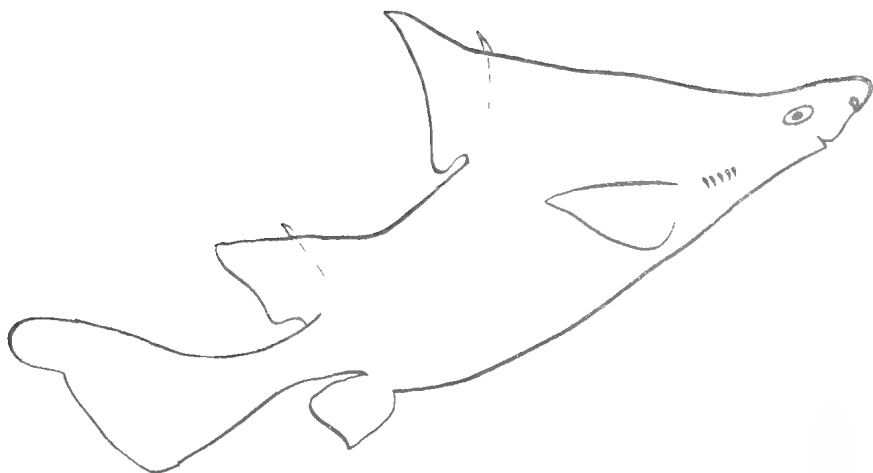
## SPOTTED DOGFISH.

*Squalus fernandinus*. Molina.

Snout produced. Two dorsal fins, each with spine. Origin of dorsal opposite to or behind the inner posterior angle of pectoral.

Reference—Gunther, B.M. Cat. Fish, VIII., p. 418.

## PRICKLY DOGFISH.

*Oxynotus bruniensis*, Ogilby

Body oblong, with back and sides rounded, under surface flattened. Head small, depressed. Eyes large, with long supraorbital ridge. Mouth small. Skin covered with small, rough scales, each of which bears a well developed spinate projection. Colour, uniform sandy brown. Length, up to 610 mm. (2 feet).

Reference—Ogilby, Rec. Aust. Mus., 1893, II., p. 62. McCulloch, "Endeavour" Scientific Results, 1914, p. 80, pl. XIII.

The type of this species was secured at Bruny Island, Derwent Estuary. Later specimens were secured by trawling in Bass Strait (100-200 fathoms), and in the Great Australian Bight (800-200 fathoms). The uniform colouration and "Sand-paper-like" surface of upper portion of body serve to immediately identify this species, the type of which is in the Tasmanian Museum.

## SAW SHARK.

*Pristiophorus cirratus*, Latham.

Rostral cartilage produced into an exceedingly long, flat lamina, armed along each edge with a series of saw teeth. Body depressed and elongate. Dorsal fins without spines, both dorsals and pectorals covered with scales. 42 sets of teeth in upper jaw.

Reference—Gunther, B.M. Cat. VIII., p. 432.

The saw fishes are viviparous.

## SAW SHARK.

*Pristiophorus nudipinnis*, Gunth.

Very similar to *P. cirratus*, but with 35-39 sets of teeth in upper jaw.

Reference—Gunther, B.M. Cat. Fishes VIII., p. 432. McCoy. Prod. Zoo., Vic., pl. 56, fig 2.

## ANGEL SHARK

*Squatina australis*, Regan.

## Angel Shark (Continued).

Body depressed, wide. Head rounded, mouth at front. Pectorals very large and fleshy. Dorsal fins, two, small and separate. Ventrals large and fleshy. Colour, brownish, pinkish white below. Length, up to 1525 mm. (5 feet).

Reference—McCoy, Prod. Zoo., Vic., pl. 34.

The flat depressed body of the Angel Shark approaches the Rays in appearance, but the gill openings are at the side, as with Sharks. The young are born alive. It is a fairly common species.

Order *BATOIDEI* (Rays, &c.).

The Rays can usually be identified owing to the fact that the shape of the body is due to the great development of the pectoral fins, which extend forward to the snout, and spread out into fan-shaped "flaps."

## FIDDLER.

*Trygonorrhina fasciata*, M. & H.

Body depressed, gradually passing to tail. Snout rather short. Colour, pale reddish brown, with wavy markings. Length, up to 1220 mm. (4 feet).

Reference—Gunther, B.M. Cat. Fishes VIII., p. 448.

## TASMANIAN NUMB FISH.

*Narcine tasmaniensis*, Rich.

Trunk a broad smooth disc. An electric organ between pectoral fins and head. Colour, above reddish brown, under greyish white. Length, 380 mm. (15 inches).

Reference—Gunther, B.M. Cat. VIII.

The Numb Fish is also known as the "Electric Ray" or "Electric Torpedo," on account of the fact that it possesses an electric organ capable of giving a severe shock to anyone touching it.

## ROUGH-BACKED SKATE.

*Raja nitida*, Gunther.

Disc broad, upper surface covered with minute prickles directed backwards. Colour, light brown, marbled darker.

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 10.

## THORN-BACK SKATE.

*Raja lemprieri*, Rich.

Disc broad. A series of spines along back.

Reference—Richardson, Voy. Err & Terr., Fishes, p. 34, pl. 23.

The type locality of this common species is Port Arthur.

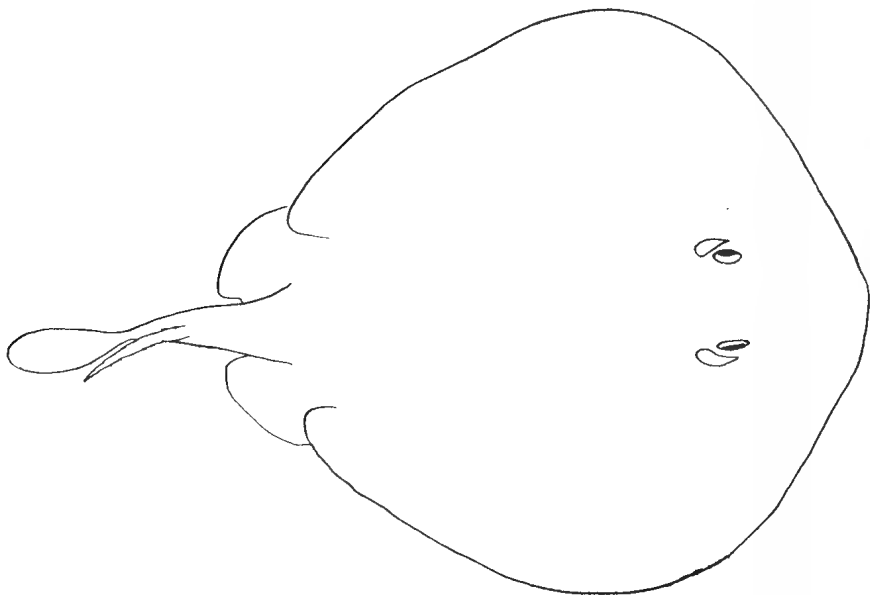
## SHORT-TAILED STINGAREE.

*Dasyatis brevicaudatus*, Hutton.

Disc sub-quadrilateral, wider than long. Tail with spine in centre, number of rough tubercles near tip. Colour, greyish brown above, white below. Width, 1200-1400 m.m.

Reference—McCulloch, "Endeavour" Scientific Results, 1915, p. 102, pl. XV., fig. 1.

## BANDED STINGAREE.

*Urolophus crucicatus*, Lacep.

Disc rather broader than long. Tail of moderate length, with distinct rayed terminal fin, armed with a serrated spine. Skin smooth. Tail shorter than disc. Colour, yellowish, often with one or more blackish longitudinal lines. Width, 200-250 mm.

Reference—Gunther, B.M. Cat. VIII., p. 485. Richardson, Voy. Err. & Terr., p. 34, pl. 24.

## GREEN-BACKED STINGAREE.

*Urolophus viridis*, McCulloch.

Breadth of disc greater than length. Snout produced. Eyes prominent. Tail depressed, with spine in centre. Above green (when alive). Width, 230-275 mm.

Reference—McCulloch, "Endeavour" Scientific Results, 1916, p. 176.

McCulloch records this species from moderately deep water off the East Coast of Tasmania. The green colour of the back changes to brown soon after death.



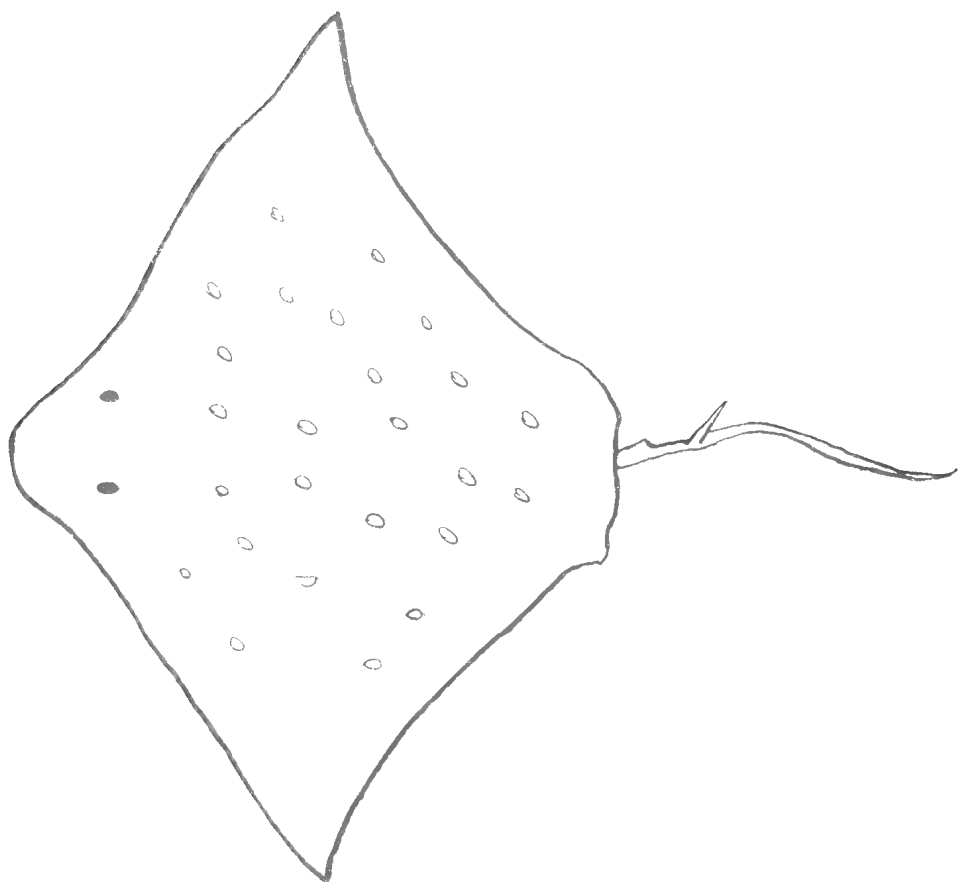
## SANDY-BACKED STINGAREE.

*Urolophus bucculentus*, Macleay.

Disc angular. Caudal shorter than disc. Spine large. Colour, above brown which continues to margins of under surface, which is yellowish.

Reference—Macleay, P.L.S., N.S.W., 1885, IX., p. 172. Waite, Mem. Aust Mus., 1899, pl. 5.

## EAGLE, or WHIPTAIL RAY.

*Myliobatis australis*, Macleay.

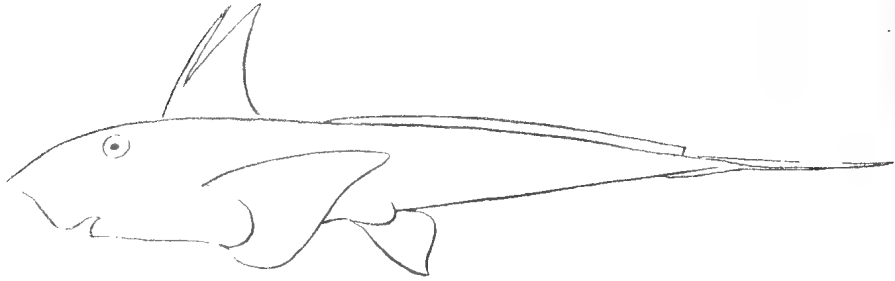
Body rhomboidal. Head rounded and elevated, with rounded fleshy expansion in front. Pectoral fins falcate at tips. Tail with spine at short distance behind dorsal. Colour, upper yellowish brown, marked with bluish spots, under whitish. Width, 915-1220 mm. (3-4 feet).

Reference—McCoy, Prod. Zoo., Vic., pl. 63.

Order *HOLOCEPHALI* (Ghost Sharks, &c.).

GHOST SHARK.

*Chimaera ogilbyi*, Waite.

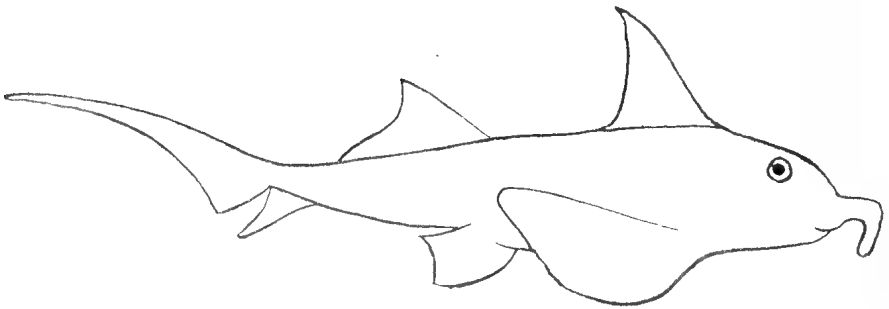


Body elongate. Pectoral fins free. Anterior dorsal above pectorals. Snout prominent. Colour, silvery above, with darker bands and markings, yellowish below.

Reference—Waite, Mem. Aust. Mus., 1899, p. 48, pl. VI. McCulloch, "Endeavour" Scientific Results., 1911, p. 15.

ELEPHANT FISH.

*Callorhynchus millii*, Bory.



Snout with cartilaginous prominence, terminating in cutaneous flap. Two dorsal fins, the first with strong spine. Colour, greenish yellow, with variable black markings. Length, up to 915 mm. (3 feet).

Reference—Waite, Rec. Cant. Mus., 1, 2, 1909, pl. XVI., fig. 2.

This peculiar *Chimaera* is generally known as the Elephant Fish, probably on account of the peculiar trunk-like formation on the snout. The males are also provided with a frontal clasper. It is a fairly common species around the South Coast of Tasmania, and specimens are occasionally secured in the River Derwent. Oviparous.

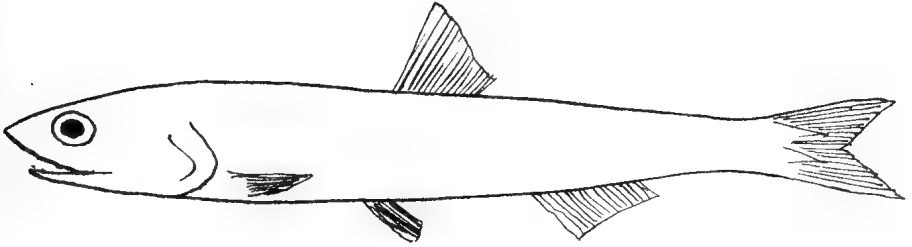
## ORDER ISOSPONDYLI.

## (HERRINGS AND TROUT-LIKE FISHES.)

The fishes of this order have only one dorsal fin, which is without spines; a secondary adipose dorsal may be present or absent. The range of the order is cosmopolitan, and certain of the species are famous food fishes.

## AUSTRALIAN ANCHOVY.

*Engraulis australis*, Shaw.



D. 16-17; A. 18-20; L. lat. 48-50.

Body scaly, oblong, and compressed. Origin of dorsal midway between end of snout and root of caudal fin. Colour silvery, with dark stripe and darker greenish colouration on upper surface. Length, up to 110 mm. (4½ inches).

References—Gunther, Cat. Fishes, VII., p. 386. Waite, Fishes of Australia (1923), p. 56.

The Australian Anchovy is practically the same fish as the Anchovy of the Mediterranean, and there seems to be no reason why the same economic advantage should not be taken of it. It is a pelagic species, often occurring in shoals, but on occasions it enters the estuaries.

## AUSTRALIAN SPRAT.

*Clupea bassensis*, McCulloch.

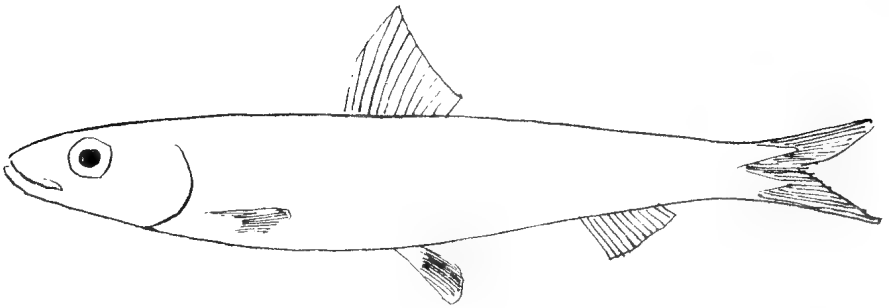
D. 15-18; A. 17-20; V. 7; L. lat. 47-48.

Scales smooth. Height of body equal to length of head. Ventral even with origin of dorsal. General colour silvery, with upper part of body dark blue. Length, 115 mm. (4½ inches).

Reference—McCulloch, "Endeavour" Scientific Records (1911), Vol. 1, p. 16.

The Sprat is another pelagic species which appears in shoals off the coast, and occasionally appears in the estuaries in enormous numbers. (See Papers and Proceedings of the Royal Society of Tasmania, May, 1867.)

## BLUE SPRAT.

*Stolephorus robustus*, Ogilby.

D. 12; A. 11; P. 13; V. 8; C. 17.

Body moderately elongate, snout obtusely pointed. Eye large. First ventral ray a little behind root of dorsal. Anal with two simple rays anteriorly, the third longest. Colour—Upper dark blue, under silvery, an oblique dark streak on side of snout in front of eye, and dark horse-shoe mark on base of tail. Length, 70 mm. ( $4\frac{3}{4}$  inches).

Reference—McCulloch, Records Australian Museum, 1920, XIII., 2, p. 43, pl. XI., fig. I.

## AUSTRALIAN PILCHARD.

*Sardinia neopilchardus*, Steidn.

D. 18-20; A. 18-20; V. 7-8; P. 17-18; C. 17-19.

Body elongate. Caudal forked. Colour, dark bluish green, sides and under silverish. Each scale with small blackish basal spot. Tips of jaw blackish. Length, 240 mm. ( $9\frac{1}{2}$  inches).

Reference—McCulloch, Rec. Aust. Mus. (1919, XII., p. 172, pl. XXVI., fig. I.

The Australian Pilchard is very similar to the European Pilchard or Sardine. and the remarks made concerning the previous species and their economic importance apply with equal force to this form. Large shoals appear off the coasts occasionally; for instance, in August, 1922, there were large shoals in Storm Bay, where they were consumed in thousands by shoals of Barracouta.

## BEAKED SALMON.

*Gonorhynchus greyi*, Rich.

D. 11-13; A. 9; V. 9; P. 10; C 18.

Scales small; body elongate and cylindrical. Height of body about one-half of length of head. Pointed, overhanging snout, with two barbels. General colour sandy. Length, up to 420 mm. ( $16\frac{1}{2}$  inches).

Reference—Gunther., Cat. Fishes, Volume VII., p. 373.

The Beaked Salmon is called the "Sand Eel" in New Zealand, and is also referred to as the Sand Fish, but the latter names are scarcely appropriate, and it is as well to strive for the adoption, as far as possible, for the one vernacular designation for all species. The Beaked Salmon is occasionally captured in the Derwent.

## JOLLYTAIL (Minnow).

*Galaxias attenuatus*, Jenyns.

D. 10-13; A. 15-19; P. 12; V. 7.

Body elongate, scaleless. Ventrals with seven rays. Origin of anal opposite to dorsal. Colour, yellowish olive, with faint spots. Length, about 100-150 mm.

Reference—Gunther, Cat. Fishes, Volume VI., p. 210.

The Jollytail is a common species in many estuaries and creeks. It is the form found in brackish water, and does not appear in the lakes, where its place is taken by the Spotted Mountain Trout. This and the following species are really Minnows, which fishes in the indigenous fauna of Tasmania, would appear to occupy the position which the *Salmonidæ* do in the Old World.

In addition to the foregoing, Johnston (Pap. & Proc. Roy. Soc., Tas., 1882, p. 131) has described the following:—

*Galaxias weedoni*, The Mersey Jollytail.

*Galaxias atkinsoni*, The Pieman Jollytail.

Mr. McCulloch has pointed out that *G. weedoni* is synonymous with *G. atkinsoni*. The former differs from *G. attenuatus* in the relative positions of the dorsal and anal fins.

## SPOTTED MOUNTAIN TROUT.

*Galaxias truttaceus*, Cuv. & Val.

D. 11; A. 14-15; V. 7; P. 14.

Body fairly stout. Ventrals with seven rays. General colour dark olive, with numerous small blackish spots. Length, 100-175 mm.

Reference—Gunther, Cat. Fishes, Volume VI., p. 209.

The Spotted Mountain Trout is common in most of the fresh water streams and lakes, but does not occur in the lower reaches and brackish estuaries, where its place is taken by the "Jollytail."

## LAKE TROUT.

*Galaxias auratus*, Johnston.

D. 11; A. 14-15; V. 7; P. 14.

Length of body five times the height. Ventrals with seven rays, tipped black. Head blackish. General body colour silvery, blotched golden. Length, 200-250 mm.

Reference—Johnston, Pap. & Proc. Roy. Soc., Tas., 1882, p. 131.

The Lake Trout is found in the vicinity of the Great Lake, and it appears to only frequent lakes at high altitudes. Johnston states:—"It attains a larger size than any other species of the genus," but there are some very large native trout in certain of the streams of the Cradle Mountain district; for instance, the Pencil Pine Creek.

## FAMILY SALMONIDÆ.

Several species of this family have been introduced into Tasmania. (See Allport, Proc. Roy. Soc., Tas., 1866), such as the

*Salmo salar*, Linn.—English Salmon.

*Salmo fario*, Linn.—Brown Trout.

*Salmo irideus*, Gibbons.—Rainbow Trout.

*Salmo levenensis*.—Loch Leven Trout.

*Salmo trutta*.—Salmon Trout.

*Salmo sebago*.—Sebago Salmon.

*Salmo fontinalis*.—American Brook Trout.

*Onchorhynchus nerka*.—Sock-eyed Salmon.

*Onchorhynchus quinnat*.—Quinnat Salmon.

## ARGENTINE (Siel Smelt).

*Argentina elongata*, Hutton.

D. 10-11; A. 11-12; P. 15; V. 12.

Head slightly less than one-quarter of total length. Colour, yellowish white, and in immature form, with silvery band down each side, and a dark mark over eye. An adipose fin opposite to anal fin. Length (variable), up to 200 mm.

References—Hutton, A.M.N.H. (1879) III., 5, p. 53 McCulloch's "Endeavour" Scientific Records (1912. I, p. 18. Waite, Fishes of S.A., p. 63.

A small deep water species, which is occasionally obtained during trawling operations. There are records of its occurrence in Bass Straits and Fleurieu Bay. The Argentines are the deep water representatives of the *Salmonidæ*.

## AUSTRALIAN GRAYLING ("Cucumber Herring").

*Prototroctes murana*, Gunther.

D. 10; A. 19; P. 13; L. lat. 78.

Body compressed. Head small. Ventrals seven. Dorsal fin in front of anal. General colour, greenish olive, sides and under surface silvery. No lateral line. Length, 250 mm.

Reference—Gunther, Cat. Fishes, Volume V., p. 382.

The Grayling, or "Cucumber Herring," so-called from the distinctive cucumber-like scent of the fish, was very plentiful many years ago, but it is now only found in certain rivers, mostly in the North-East, and is nowhere as plentiful as formerly. This species is closely related to the *Salmonidæ* family. Ascends far up the rivers in early summer, returning in March to brackish water to spawn.

## DERWENT SMLT.

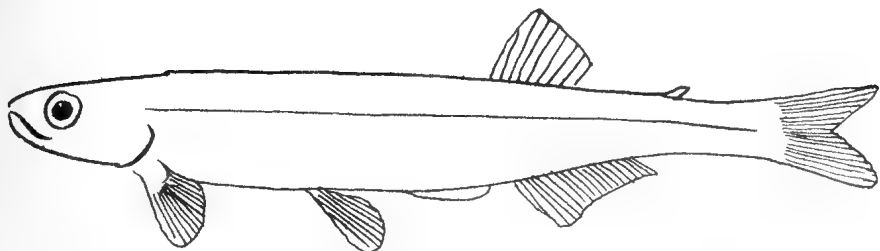
*Lovettia sealii*, Johnston.

D. 8-9; A. 19-20; V. 7; P. 9-12.

Head broad and depressed. Lower jaw slightly the longer. Adipose fin rudimentary. Body ornamented with extremely minute blackish dots, from ventrals forward. These dots form two lines, which ultimately unite under mandibles. Silver band on sides. Length, 40-50 mm.

Reference—Johnston, P. & P. Roy. Soc., Tas., 1882, p. 128 (*Aplochitonidæ sealii*).

## TASMANIAN SMELT ("Whitebait").

*Retropinna tasmanica*, McCulloch

D. 3/8-9; A. 3/14-18; V. 6; P. 9-11; C. 18.

Body elongate, covered with cycloid scales of moderate size. Dorsal fins far back. Anal larger than dorsal. Pectoral low down on side. Caudal forked. Anal commences below anterior of dorsal fin. Colour uniform, with more or less distinct band on side. Length, 60-70 mm.

Reference—McCulloch, Rec. Aust. Mus. (1920), XIII., p. 54. *R. tasmanica*. *R. richardsoni* of Johnston's list (P. & P. Roy. Soc., Tas., 1882, p. 128.

## ORDER INIOMI.

This order has few representatives in Tasmania. It is doubtful if the fish generally known as "Sergeant Baker" (*Aulopus purpurissatus*) can be classed as a Tasmanian form, the Cucumber Fish (*C. nigripinnis*) is a deep water fish, which is not often secured unless by trawlers, and the Lancet Fish (*A. ferox*) is a rare ocean species, only recorded on few occasions.

## CUCUMBER FISH.

*Chlorophthalmus nigripinnis*, Gunther.

B. 7; D. 11; A. 9; L. lat. 50.

Length of head about one-quarter that of total length. Eye large. General colour, silvery. Dorsal and caudal tipped black.

References—Gunther, A.M.N.H. (1878), 5, II., p. 182. McCulloch's "Endeavour" Scientific Records (1911), I., p. 22.

This species was first obtained in Tasmanian waters by the Federal trawler "Endeavour" during operations off the East Coast of Tasmania. It was originally described by Gunther from specimens secured off Twofold Bay from 120 fathoms.

## LANCET FISH.

*Alepisaurus ferox*, Lowe.

Height of body half length of head. Ventrals far behind pectorals. Dorsal fin considerably elevated and extended. Length, up to six feet (1830 mm.).

Reference—Gunther, Cat. Fishes, Volume V., p. 421.

The Lancet Fish is one of the most formidable of fishes, being of large size, and possessing a "large Barracouta-like mouthful of teeth." It is only on very rare occasions that this species is observed on the Tasmanian coast.

## ORDER OSTARIOPHYSI.

The members of this order which have been introduced into Tasmania belong to the Cyprinoid family, and are fresh water fishes possessing a single dorsal fin, which has a separate spine at the anterior end. The following may be mentioned as occurring in Tasmania, as they have been introduced into various localities:—

European Carp (*Carassius carassius*, Linn).

Gold Fish (*Carassius auratus*, Linn).

English Tench (*Tinca tinca*, Linn).

## ORDER SYMBRANCHII (Pigmy Eels).

The members of this order occurring in Tasmania are small eel-like forms a few inches long. They can be distinguished from the true Eel family owing to the fact that they have only one gill opening, and this is on the ventral surface.

## SHORE EEL.

*Cheilobranchus rufus*, Macleay.

General colour greenish, with more or less distinct spots on sides. Length, 75-100 mm.

Reference—Macleay, Cat. Aust. Fish., No. 909.

Also known as the Red-banded Shore Eel, as specimens preserved in spirits change to a reddish colour.

## STRIPED BROWN SHORE EEL.

*Cheilobranchus dorsalis*, Rich.

References—Gunther, Cat. Fish., Volume VIII., p. 18. Richardson, Voy. Err. & Terr., p. 51.

Further research is needed in regard to this species.

## ORDER APODES (Eels).

The true Eels can be recognised by the fact that they have two gill openings, which are lateral in position.

## SHORT-FINNED EEL.

*Anguilla australis*, Richardson.

Dorsal fin commences at very short distance in front of anal fin. Tail rather larger than body. Colour, olive brown above, white below.

Reference—Gunther, B.M. Cat., Volume VIII., p. 36.

Common in inland rivers, etc., proceeding to the ocean to breed, the young eels returning to the rivers.

## LONG-FINNED EEL.

*Anguilla reinhardtii*, Steindachner.

Reference—Gunther, B.C. Cat., Volume VII., p. 27.

The long-finned Eel is distinguished from the Short-finned Eel species owing to the fact that the dorsal fin extends farther forward than in the Short-finned form.



## COMMON CONGER EEL.

*Leptocephalus conger*, Linn.

Dorsal fin begins nearly opposite extremity of pectoral fins. Body and pectoral fins uniform colouration. Length, approximately 1200 mm.

Reference—Gunther, B.M. Cat., Volume VIII., p. 38.

Common in many localities such as D'Entecasteaux Channel, where it is met with over six feet (1830 mm.) in length.

## CONGER EEL.

*Leptocephalus wilsoni*, Castel.

Dorsal fin commences behind extremity of pectorals. Colour of upper parts brownish black. Under surface greyish white. Length approximately 1200 mm.

Reference—Cast., Proc. Zoo. Soc., Vic., I., p. 193.

## LITTLE CONGER EEL (Silver Eel of Tasmania).

*Conger muræna habenata*, Rich.

Upper jaw projects beyond lower. Tail rather longer than body. Dorsal fin begins immediately behind base of pectoral.

Reference—Gunther, B.M. Cat., Volume VIII., p. 42.

This species is occasionally caught in the Derwent, or is washed ashore in weeds, etc., after storms. It is generally known as the Silver Eel in Tasmania.

## TASMANIAN WORM EEL.

*Murænichthys tasmaniensis*, McCulloch.

Body worm-like. Dorsal and anal fins very low. Ventral well in advance of middle of length. Length, 170 mm.

Reference—McCulloch, "Endeavour" Scientific Results (1911), I, p. 19.

Type specimen obtained from Fleurieu (Oyster) Bay, on East Coast of Tasmania.

## SHORT-HEADED EEL.

*Murænichthys breviceps*, Gunther.

Origin of dorsal fin is twice as distant from vent as from gill opening. Pectoral fins absent. Snout very long and narrow. Cleft of mouth extends behind eye. Length, 375-500 mm.

Reference—Gunther, A.M.N.H. (1876), XVII., p. 401.

Originally described by Gunther from a specimen twenty inches long, sent from Tasmania by M. Allport.

## SNAKE EEL.

*Ophisurus serpens*, Linn.

Snout slender and elongated. Dorsals commence behind pectorals. Length of body slightly more than half length of tail. Length, up to 1500 mm.

Reference—Gunther, B.M. Cat., VIII., p. 65.

As regards the right of this species to appear upon the Tasmanian faunal list, we know of no further records or specimens beyond the reference made by Ogilby (Pap. & Proc. Roy. Soc., Tas., 1896, p. 85).

## ORDER SOLENICHTHYES.

(Bellows Fish, Pipe Fish, Sea Horses, etc.)

The fishes of this order are distinguished by the presence of a tubiform snout. Some genera have the body covered with rough scales, and in others it is enclosed with bony rings.

## BELLOWS FISH.

*Macrorhamphosus elevatus*, Waite.

D. 5-12; A. 20; P. 16; V. 5.

References—Waite, Mem. Aust. Mus. (1889), IV., I., p. 59. McCulloch, "Endeavour" Scientific Results (1911), I., p. 23.

This and allied species are often referred to as "Trumpet Fishes" or "Sea Snipe," owing to the elongated tubiform snout.

## BELLOWS FISH.

*Centriscops humerosus*, Rich.

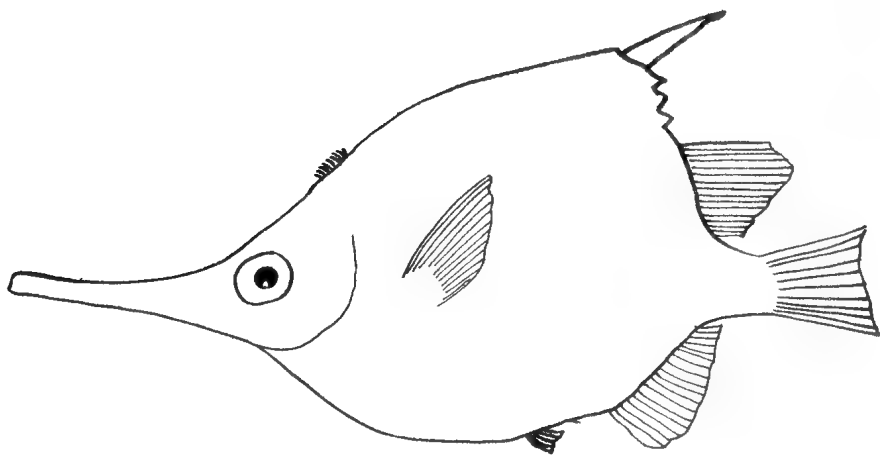
D. 6-8/15-16; A. 17-19; P. 16-17; V. 1-4; C. 9.

Length, 150-250 mm.

Reference—McCulloch, "Endeavour" Scientific Results (1914), II., p. 90.

Dorsal hump prominent, especially in adult specimens.

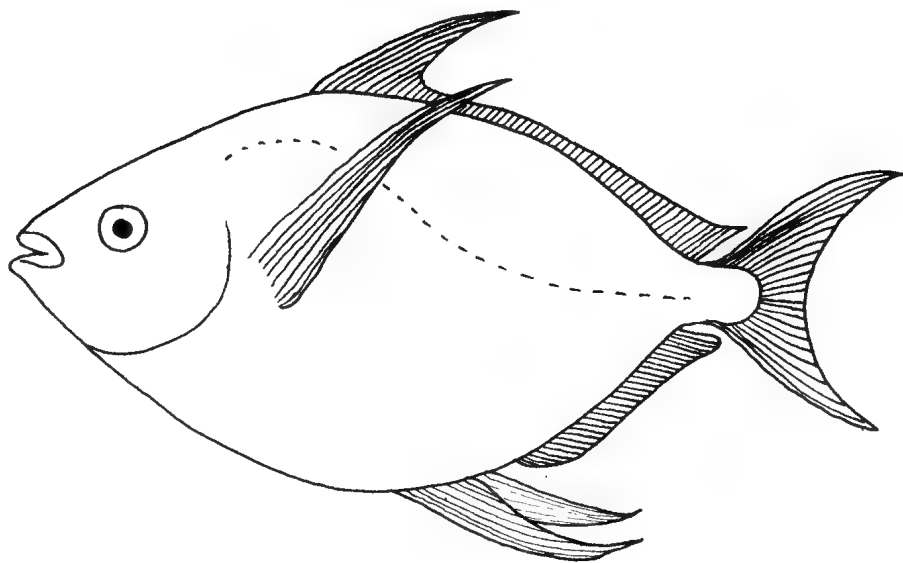
## BELLOWS FISH.

*Notopogon lilliei*, Regan.

Reference—McCulloch, "Endeavour" Scientific Results (1914), II., p. 91.

Differs from *C. humerosus* in not having the prominent hump on back, and also has a more tender snout. Scales minute and velvety.

## ОПАХ.

*Lampris luna*, Cuvier.

D. 53-55; A. 38-41; V. 14-16.

Body compressed and elevated. Anterior portion of dorsal elevated, falcate. Pectorals and ventrals, long, tapering. Colour, above bluish, under yellowish, the whole body covered with white spots. Fins and mouth red.

Reference—Gunther, B.M. Cat., II., p. 416.

A single specimen of this fish was washed ashore at Port Arthur, S.E. Coast of Tasmania, in December, 1895. The specimen is now in the Tasmanian Museum, and there is a coloured drawing of the fish, as it appeared when fresh, in the Museum Register (T.M., No. 4687). The weight of this fish was 29lbs., total length 1200 mm. (4 feet), girth 660 mm. (26 inches).

## MEDIUM-SNOUTED PIPE FISH.

*Corythoichthys phillipi*, Lucas.

D. 25-28; Ossevs Rings 18-20 and 40-48.

References—Lucas, Proc. Roy. Soc., Vic. (N.S.), 1891, p. 12. McCulloch, "Endeavour Scientific Results (1911), I., p. 26.

Specimens were obtained by the "Endeavour" in Fleurieu (Oyster) Bay, on the East Coast of Tasmania.

## PIPE FISH.

*Urocampus carinirostris*, Castelnau.

D. 20-22; Oss. R. 18 and 42.

Length, 100 mm.

Reference—Castelnau, P.Z.S., Vic., 1872, I., p. 201.

Specimens of this species have been secured at Table Cape, N.W. Tasmania.

## SPOTTED PIPE FISH.

*Stigmatopora argus*, Rich.

D. 49-52; Oss. R. 17-22 and 70-90.

Length, 200-250 mm.

Reference—Gunther, B.M. Cat., Volume VIII., p. 189.

This species is common in Tasmanian waters.

## PIPE FISH.

*Stigmatopora nigra*, Kaup.

D. 36-43; Oss. R. 16-18 and 70-75.

Length, 100-125 mm.

Reference—McCulloch, Aust. Zoologist, I., p. 30.

This species was fairly common in Thouin (Wineglass) Bay when the Tasmanian Field Naturalists' Club camped there during Easter, 1914.

## PIPE FISH.

*Leptonotus semistriatus*, Kaup.

D. 38; Oss. R. 21 and 49.

Reference—Gunther, B.M. C., Volume VIII., p. 162.

A fairly common Tasmanian species.

## PIPE FISH.

*Solegnathus spinosissimus*, Gunther.

D. 35; Oss. R. 27 and 35.

References—Gunther, B.M. Cat., VIII., p. 195. Johnston, P. & P. Roy Soc., Tas., 1882, p. 134.

## SEA HORSE.

*Solegnathus fasciatus*, Gunther.

D. 35-39; Oss. R. 27 and 55.

Length, up to 407 mm. (16 inches).

References—Waite, P.I.S., N.S.W., IX., p. 222. McCulloch, "Endeavour" Scientific Results (1911), I., p. 27.

## PIPE FISH.

*Histiogamphelus briggsi*, McCulloch.

D. 23; P. 13; C. 10.

Snout short. Tail slightly longer than head and body. High ridge on upper part of snout. Dorsal fin above vent. Tail quadrangular, with well developed caudal fin. Anal minute. Pectorals large.

Reference—McCulloch, Aust. Zoologist, Vol. I., p. 31.

The type specimen (Tasmanian Museum, No. D. 79) was secured on the East Coast of Tasmania during the 1914 Easter Camp of the Tasmanian Field Naturalists' Club to Thouin (Wineglass) Bay.

## LEAFY SEAHORSE.

*Phyllopteryx foliatus*, Shaw.

D. 30-33; Oss. R. 17-18 and 32-38.

References—Gunther, B.M. Cat., VIII., p. 196. Waite, Fishes of S.A., p. 82.

This species is often met with both in the estuaries and along the coast.

## SEA HORSE.

*Hippocampus abdominalis*, Leeson.

D. 26-31; A. 4; P. 14-17; Oss. R. 11-13 and 44-49.

Length, up to 255 mm. (10 inches).

Reference—Gunther, B.M. Cat., VIII., p. 199.

This species, which is easily recognised on account of its prominent abdomen is very common in the Derwent.

## SHORT-HEADED SEAHORSE.

*Hippocampus breviceps*, Peters.

D. 19-22; A. 4; P. 14; C. 15; Oss. R.

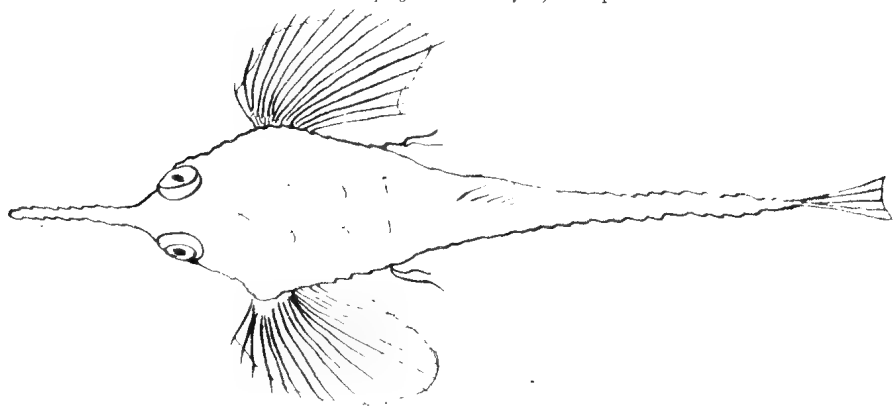
Length. 70 mm. (2 $\frac{3}{4}$  inches).

References—Gunther, B.M. Cat., Volume VIII., p. 200. Waite, Fishes of S.A. p. 86.

## ORDER HYPOSTOMIDES (Dragon Fishes).

The Dragon Fishes are small forms, in which the body is encased in long plates. the snout is elongated, and the pectoral fins are very large.

## DRAGON FISH.

*Acanthopegasus lancifer*, Kaup.

D. 5; A. 5; P. 15-16; C. 8.

Five anterior rays of pectoral fins, with strong spines. Body encased in long plates. Snout long. Length, 50-90 mm.

Reference—McCulloch, "Endeavour" Scientific Results, III., p. 108.

The Dragon Fish, or Winged Dragon, is a very common species in the Derwent Estuary, and numbers are brought into the Tasmanian Museum for identification. We have often obtained it during dredging operations.

ORDER *SYNENTOGNATHI* (Garfish, &c.).

## BILL FISH.

*Scombresox forsteri*, Cuv. & Val.

D. 10.6; A. 11.7; V. 6; P. 12; C. 20.

Body slender, elongate and compressed. Both jaws produced, forming a bill. (The Garfish has only the lower jaw produced.) Detached finlets behind dorsal and anal fins. Colour bright silvery, back blue. Length, 300-400 mm.

Reference—Waite, Fishes of S. Australia, p. 88.

This species is also known as the "Skipper," owing to its habit of skipping above the surface of the water.

Mr. Hammond, fishmonger, of Sandy Bay, brought specimens of the fish to the Tasmanian Museum. They had been captured in the River Derwent. This species had not previously been recorded from Tasmania.

## SEA GARFISH.

*Hemirhamphus intermedius*. Cantor.

D. 15-17; A. 18-20; V. 6; P. 11-12; C. 15.

Body slender, elongate, and compressed. Length of lower jaw beyond the tip and upper one, slightly more than half length of head. Scales fairly large, rounded. Dorsal fin opposite to and equal to anal fin. Caudal forked. Colour green, sides silvery, with silver medium band. Length, 250-500 mm.

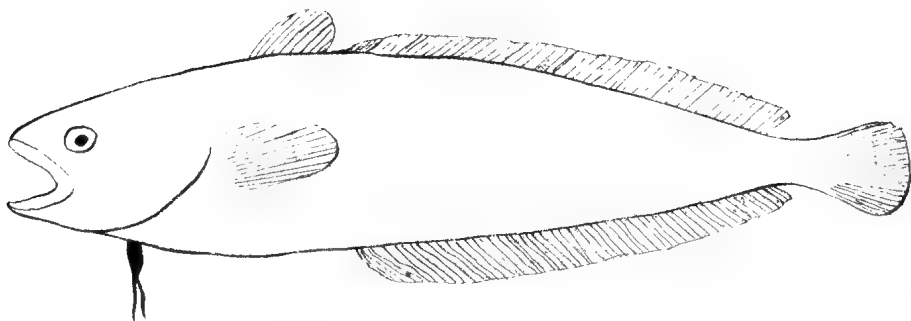
References—McCoy, Prod. Zoo., Vic., II., p. 135. Roughley, Fishes of Australia, p. 27.

The Sea Garfish ranges from Tasmania to Japan, and constitutes a food fish of considerable value. It usually enters the estuaries to spawn during the summer months, the comparatively large eggs being attached to seaweed. During this time they are often taken in large numbers. This species is often referred to as the "Beakie" in New South Wales.

ORDER *ANACANTHINI* (Rock Cod, Whiptails, &c.).

An order in which its members are distinguished by the absence of true spines in the vertical fins. Both the Rock Cod and the Whiptails are food fishes of some value.

## SMALL SCALED ROCK COD (Beardie, of N.S.W.).

*Lotella callarias*, Gunther.

B. 7; D. 4-6/60-65; V. 7-8; A. 55-58; C. 28.

Outer teeth larger than those of the inner rows, conical and irregular. Body moderate elongate, tapering from head. Scales very small. Chin with barbel. General colour brown, becoming lighter towards under surface. Margins of fins tinged black.

References—McCoy, Prod. Zoo. Vic., Volume I., pl. 19. Waite, Rec. S.A. Museum II., I., p. 66.

This species can be distinguished from the ordinary Rock Cod on account of the more uniform brown colouration, the smaller scales, and the comparatively large outer teeth. On the mainland this species is known as the "Beardie" or "Ling." Recorded by Johnston as *Lotella swanii* (P. & P. Roy. Soc., Tas., 1882, p. 126).

### COMMON ROCK COD.

*Physiculus barbatus*, Gunther.

B. 7; D. 9-11/48-58; P. 22-26; V. 5-6; R. 44-57; C. 26-30; L. lat. 95-120; Tr. 15-18/36-47.

Outer teeth no larger than those of the inner rows. Teeth generally small, short, hooked, and sub-equal. Chin with barbel. General colour, reddish purple, with dark spots at base of pectoral, remaining fins tipped black.

References—McCoy, Prod. Zoo. Vic., Vol. I., pl. 20. Waite, Rec. S.A. Museum, II., I., p. 67.

No Tasmanian species, with perhaps the exception of the Flathead, is better known than the Rock Cod. During the autumn months it is to be caught in abundance in the Derwent and other localities.

### RED ROCK COD.

*Physiculus bachus*, Forster.

B. 7; D. 8-11/48-58; P. 22-26; V. 5-6; A. 44-57.

Very similar to *P. barbatus*, except that the ventrals are narrow at base, and the snout is shorter than eye.

References—Richardson, Voy. Err. & Terr., Zool., p. 61, pl. XXXVIII., figs 1 and 2. (*Lota breviscula*.) Waite, Rec. S.A. Mus., II., I., p. 68.

Fishermen usually group the three rather similar species as "Rock Cod," and disregard the minor specific differences.

### WHIPTAIL (Grenadier).

*Cælorhynchus australis*, Rich.

D. 15-88; A. 87; V. 7; L. lat. 130.

Scales moderate, keeled. Head with rough ridges. Body terminating in a long compressed tapering tail. First anterior dorsal short, the second very long and continued to end of tail.

Reference—Gunther, B.M. Cat., IV., p. 391.

This species is plentiful on the West Coast, and also is occasionally taken in deeper water on other parts of the coast.

### TASMANIAN WHIPTAIL.

*Macruronus nova-zealandiæ*, Hector.

B. 7; D. 15/103; A. 90; V. 8.

Length, five and a half times the head. Colour silvery, upper portions purplish, below white. A pale brown patch from eye to pectoral fin.

Reference—McCulloch, Rec. Aust. Mus., IX., 3, 1913, p. 358.

This species, which is smaller than the preceding one, visited the Derwent in thousands some years ago. Odd specimens are occasionally taken in the Derwent Estuary, and Mr. L. Rodway informs us that this species is plentiful on parts of the West Coast. In New Zealand this fish is known as the "Hoki."

#### DEEP SEA WHIPTAIL.

*Optonurus denticulatus*, Rich.

D. 1/10/75; A. 87; V. 7.

Colour, grey. Length, 500-800 mm.

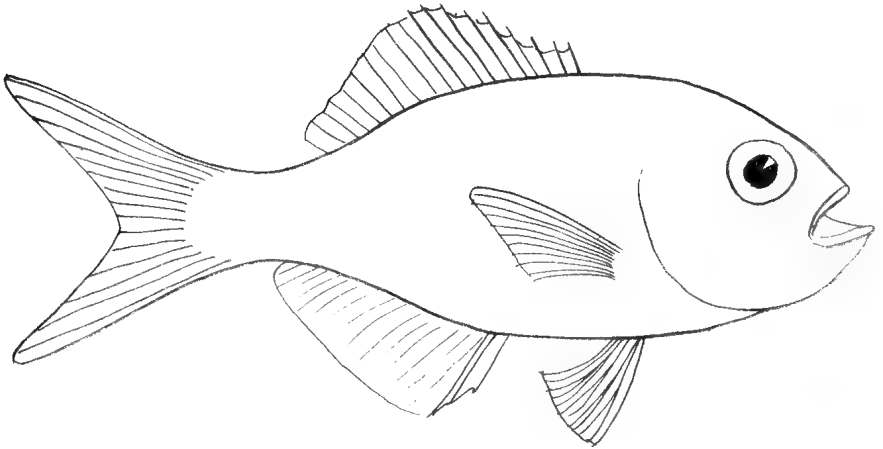
References—Richardson, Ichth. Err. & Terr. 1846). p. 53. Waite, Fishes of South Australia, p. 90.

A deep water species. Specimens have been secured by trawlers in Bass Straits.

#### ORDER BERYCOMORPHI (Dories, &c.).

##### NANNYGAI.

*Trachichthodes affinis*, Gunther.



D. 7/12; A. 4/12-13; V. 1/7; P. 13; C. 19; L. lat. 41-44.

Body compressed. Eye very large, chin prominent. Pectoral one-fifth of total length. Colour red, tinged gold and silver. Length, 375-450 mm.

References—Gunther, B.M. Cat., Vol. I., p. 13. Roughley, Fishes of Aust., p. 49, pl. 11.

The Nannygai is a deep water species, which is not often taken in Tasmanian waters. Trawling operations would doubtless secure many of this species, for they are occasionally taken off the coast. Mr. W. Beddome secured a number a few years ago when fishing from his yacht near the entrance to D'Entrecasteaux Channel.



## ROUGHY.

*Trachichthys australis*, Shaw.

D. 4/11; A. 3/10; V. 1/6; P. 13; C. 27.

Reddish brown, with dark vertical bar on opercle.

Reference—Waite, Fishes of S.A., p. 98.

A small rugose fish, which frequents rocky reefs. Length, about 6 inches.

## SANDPAPER FISH.

*Paratrachichthys trailli*, Hutton.

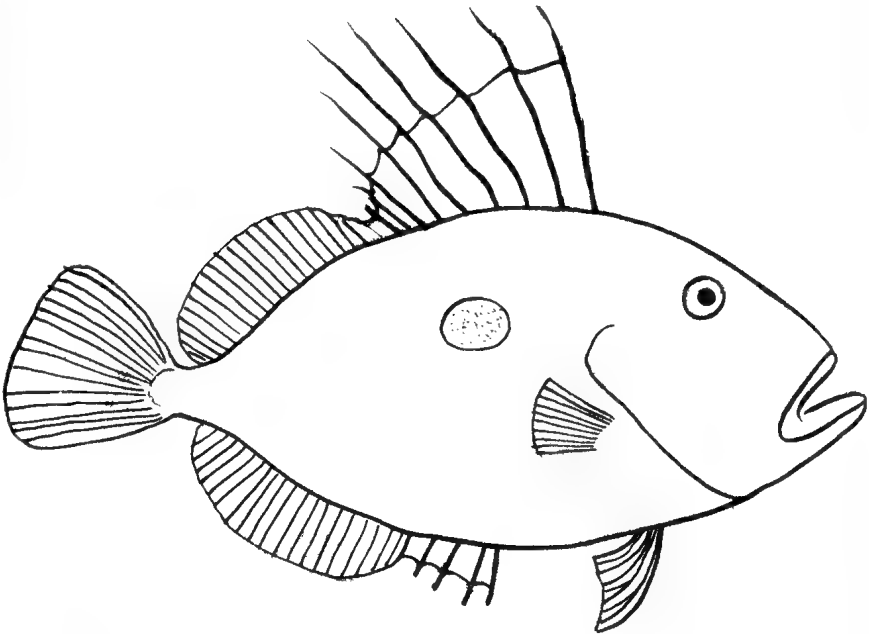
D. 5/13; A. 3/10; V. 1/6; P. 12; C. 35.

A number of spiny projections between ventral and anal fins. Colour, reddish purple, fins yellow.

References—Hutton, Trans. N.Z. Inst. (1876), p. 212. Waite, Fishes of S.A. p. 97.

A species about ten inches (255 mm.) long, which is rare in Tasmanian waters

## JOHN DORY.

*Zeus faber*, Linn.

D. 10/23; A. 4/22; V. 1/6; P. 14; C. 24.

Body compressed and elevated. Mouth wide and very protractile. Dorsal and anal fins very elongated. Colour, yellowish grey, with wavy bands, a large black spot on each side. Length, up to 600 mm.

References—McCulloch, "Endeavour" Scientific Results, 1911, p. 82. Roughley, Fishes of Australia, pl. 58.

A cosmopolitan species, which is occasionally captured in Tasmanian waters.

### MIRROR DORY.

*Zenopsis nebulosus*, Schleg.

D. 8-9/27-28; A. 3/25-27; V. 1/5; P. 12-13; C. 13 and 2.

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 83.

### SILVER DORY.

*Cyttus novæ-zealandiæ*, Arthur.

D. 8/28; A. 2/29; P. 11; V. 1/6; C. 13.

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 85.

### SILVER DORY.

*Cyttus australis*, Rich.

D. 10/33; A. 2/37; V. 1/6; P. 17.

Body with small scales. Mouth protractile. Length of body equal to approximately one and three-quarters height. General colour, silvery. Length, up to 500 mm.

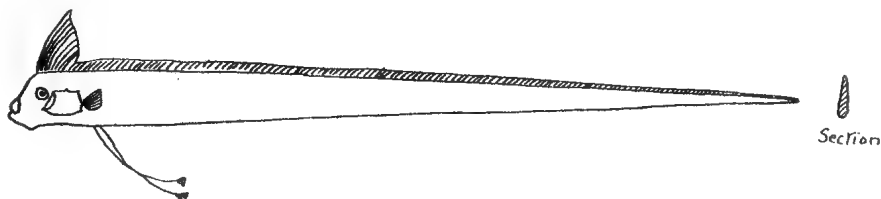
Reference—Richardson, Trans. Zoo. Soc., 1849, p. 72.

The Silvery Dory (which is sometimes referred to as a "Boar Fish" in New Zealand) is occasionally captured in the Derwent.

## ORDER ALLOTRIognathi (Ribbon Fish).

### OAR FISH.

*Regalecus glesne*, Ascanius.



Form eel-like, body very long, and greatly compressed, more than twenty times length of head, which is small. Colour, head and body silvery, marked with a number of irregular black lines and spots. Dorsal fin red. Length, about 4270 mm. (14 feet).

Reference—McCoy, Prod. Zoo., Vic., II., pl. 145.

The Oar Fish, or Giant Ribbon Fish, is a peculiar looking species, which is not often captured. A specimen secured in a fish trap at Stanley, a sketch of which is in the Tasmanian Museum, gives the dimensions as follows:—Length, 14 feet; greatest depth, 12 inches; breadth, 2 to 3 inches.

## RIBBON FISH.

*Trachipterus altivelis*, Kner.

B. 6; D. 7/190; A. 0; C. 6/4-6; P. 11; V. 7.

Ventral fins well developed. Eight teeth in upper, six in lower jaw. Colour silvery, three large black spots below dorsal fin, a fourth near abdominal edge, a little behind the first on back.

Reference—Gunther, B.M. Cat., III., 303.

A specimen of this species was captured off Maria Island, on the East Coast of Tasmania, in November, 1881. Another specimen was captured in the Derwent in March, 1914, and there are other records of Ribbon Fish being secured, but owing to the peculiar nature of their structure they are easily damaged, and are not often secured in a perfect state.

## LOPHOTES.

*Lophotes guntheri*, Johnston.

(After Johnston), D. 221/36; A. 6/14; P. 14; V. 1/5; C. 15.

Head elevated into high crest. Body elongate. Height of body is contained five and two-third times in total length, and the height of the head eight and one-third times. Eye very large. The rays of the dorsal immediately over the eye are about half an inch in length, gradually increasing to two and a half inches long behind the extremity of the pectoral, and thence gradually diminishing towards a point one and a half inches from extremity of caudal fin, where a second series of about thirty-six rays connects the principal series with caudal fin. Colour, sides silvery. Fins pinkish yellow. Length, 1100 mm.

Reference—Johnston, Pap. &amp; Proc. Roy. Soc., Tas., 1882, p. 176-8.

The specimen described by Johnston as above was caught near Emu Bay, on the North-West Coast of Tasmania. The *Lophotes* is closely related to the Ribbon Fish. Specimens of this genus have been secured from the Mediterranean and seas of Japan. Its occurrence in Australian waters is apparently very rare.

## ORDER HETEROSOMATA (Flounders and Soles).

The fish of this order are often referred to as flat fish, owing to their habit of resting on one side, at the bottom of the sea. The front of the skull is twisted in a peculiar manner, so that the two eyes are on the upper surface, which is convex, coloured, and marked. The under surface is white and flat. The dorsal and anal fins are very elongate, and form a fringe to the body.

The following occur in Tasmanian waters:—

Family *Bothidae*—*Pseudorhombus multimaculatus*, Gunther.—Small-toothed Flounder.*Pseudorhombus tenuirastrum*, Waite.—Deep-water Flounder.*Lophonectes gallus*, Gunther.—Crested Flounder.Family *Pleuronectidae*—*Ammotretis rostratus*, Gunther.—Long-snouted Flounder ("Sole" of Tasmania).*Ammotretis tudori*, McCulloch.—Flounder.*Ammotretis macrolepis*, McCulloch.—Flounder.*Rhombosolea flesoides*, Gunther.—Southern Flounder.*Rhombosolea tapirina*, Gunther.—Flounder.Family *Cynolossidae*—*Paraplagusia unicolor*.—Tongue or Lemon Sole.

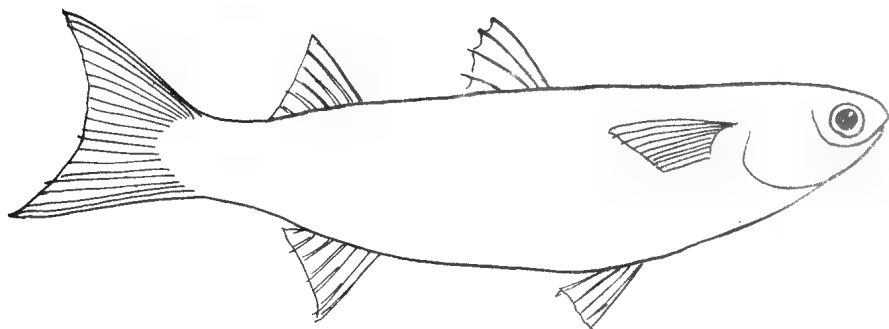
## ORDER PERCOMORPHI (Perch-like Fishes).

A very large group of fishes, in which the dorsal fin is preceded by a number of spines, and the ventral fins have never more than one spine and five rays.

## SUB-ORDER MUGILOIDÆ.

## SEA MULLET.

*Mugil cephalus*, Linn (*Mugil dobula*, Gunther).



D. 4/18; A. 3/8; V. 1/5; P. 16; C. 14.

Body elongate. Length, four and a half times the head. Eye with thick fleshy lid almost covering eye. Scales 40-42/14-15. Colour, upper bluish green, sides and under surface silvery. Pectorals greenish. Caudal yellowish, tipped dark green. Iris golden. Length, 500-650 mm.

References—Gunther, B.M. Cat., III., p. 419. Roughley, Fishes of Australia, pl. 7.

This cosmopolitan species has a very wide range. The name "Sand Mullet" is sometimes applied to this fine species, probably on account of it frequenting sand banks, etc., at spawning time, but it is essentially a sea fish in its natural state, although the immature fish frequent the estuaries and bays. The fleshy lid to the eye is a distinguishing feature.

## SAND MULLET ("Tellegalane" of N.S.W.).

*Myxus elongatus*, Gunther.

B. 6; D. 4/18; A. 3/9; P. 16; C. 14; L. lat. 42-46.

Body oblong, compressed. Length, four and three-quarters of height. Scales 42-46/14-15. Upper greenish, sides silvery, under white. Iris yellow. Length, 300-350 mm.

References—Gunther, B.M. Cat., III., p. 466. Ogilby, P. & P. Roy. Soc., Tas., 1896, p. 77. Roughly, Fishes of Australia, pl. 9.

The Sand Mullet is very similar in habits to the Sea Mullet, but is a smaller fish, and not nearly so important from the edible standpoint. This species was not recorded by Johnston in either of his lists of Tasmanian fish (P. & P. Roy. Soc., Tas., 1882 and 1890), probably owing to it being confused with closely allied species. It can readily be distinguished from the Sea Mullet (apart from minor specific differences) by the absence of the fleshy eyelid, and from the Yellow-eyed Mullet by the size and number of the scales.

## YELLOW-EYED MULLET.

*Agonostomus fosteri*, Cuv. & Val.

D. 4-1/10; A. 3/12; V. 1/5; P. 15; C. 26.

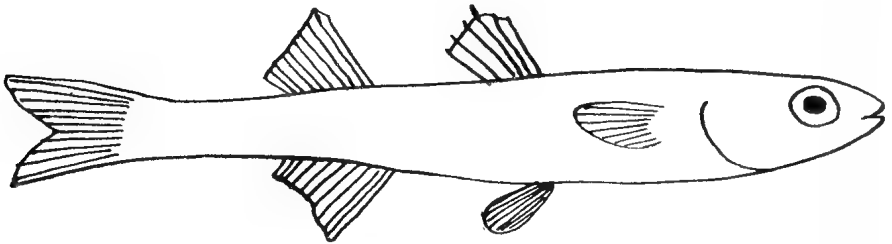
Length, four and a half times the head. Snout produced. Dorsal half-way between snout and tail. Scales small. 60-64/17-18. Upper shiny blue and green, under silvery. Caudal tipped black. Iris orange yellow. Length, 200-250 mm.

References—Gunther, B.M. Cat., III., p. 465. Waite, Fishes of S.A., p. 108.

The Yellow-eyed Mullet is often referred to by fishermen as the Sea Mullet, a designation which is also applied to it in New Zealand, but this name rightly belongs to *Mugil cephalus*. Estuary Mullet is another vernacular title used, and this is appropriate, as this fish ascends the estuaries in large numbers, where it affords sport to rod fishermen. In South Australia it is known as the Lake Mullet, or Connuri.

FAMILY *ATHERINIDÆ* (Silver Fish or Hardyheads).

These small fish, known to the Tasmanian fishermen as Silver Bellies, are plentiful in certain localities. The following species have been described from Tasmania:—

*Atherina microstoma*, Gunther.*Atherina dannevigii*, McCulloch.*Atherina presbyteroides*, Rich.*Atherina hepsetoides*, Rich.*Atherina hepsetus*, Linn.*Atherina tamarensis*, Johnston.*Atherina jacksoniana*, Quoy. & Gaim.

## SHORT-FINNED SEA PIKE (Snook).

*Sphyræna novæ-hollandiæ*, Gunther.

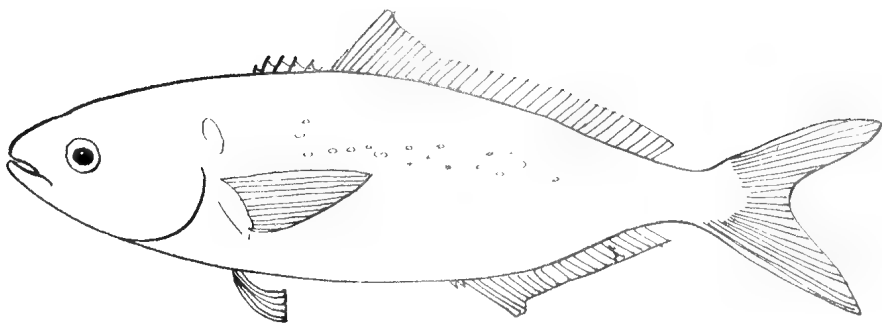
D. 5 1/9; A. 2/9; V. 1/5; P. 13; C. 17.

Body slender, elongate, and compressed. Length, about ten times the height. Lower jaw projects. Cleft of mouth wide. Teeth strong. Two dorsal fins, widely separated. Colour, greenish above, silvery white below. Usual size about 500 mm., but grows up to 900 mm.

References—Gunther, B.M. Cat., II., p. 335. Roughley, Fishes of Australia, p. 45. Waite, Fishes of S. Aust., p. 109.

The Short-finned Sea Pike is common in Victorian waters, but does not appear to be plentiful around the Tasmanian coasts. It is occasionally taken in the Derwent, the first record being in 1883 (P. & P. Roy. Soc., Tas., 1883, p. lviii).

## SPOTTED TREVALLY.

*Seriolella punctata*, Forster

D. 6-7/34-39; A. 3; P. 20-22; V. 1/5; C. 17.

Body elongate and compressed. Upper surface with fleshy skin. Caudal fin forked. Numerous small round spots along centre of body, Dark vertical bar across eye.

Reference—McCulloch, "Endeavour" Scientific Results (1911), p. 316.

Specimens of this species were secured on the East Coast (Fleurieu Bay) by the "Endeavour" in 1911. This species had previously been confused with closely allied forms.

## SNOTGAIL TREVALLY.

*Seriolella brama*, Gunther.

D. 6-7 1-2/26-33; A. 3/21-23; P. 20-21; V. 1/5.

Body compressed. Height three and a half times total length. Snout obtuse and conical. Dorsal spine feeble. Upper surface covered with fleshy skin. Eyes large. Body greenish silver, with large blotches over upper portion. Dark bar across eye. Length, 400-550 mm.

References—Gunther, B.M., Cat., II., p. 390. Waite, Fishes of S.A., p. 110.

The young of the species are often caught far up the estuaries, but the mature forms are usually taken in nets amid the kelp beds around the coast. Known as Sea Bream in S. Aust., and Warehow in N.Z.

## MACKEREL TREVALLY.

*Seriolella dobula*, Gunther.

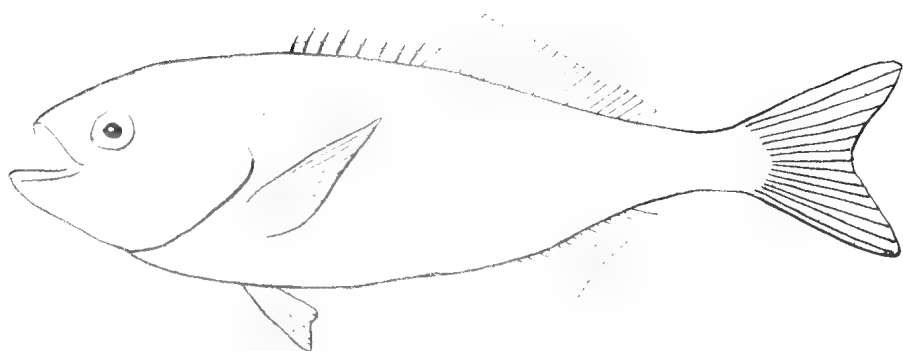
D. 6-7/1-2/26-33; A. 3/21-23; P. 20-21; V. 1/5.

Body greenish silver, with large blotches over upper portion. Dark bar across eye.

Reference—Gunther, Proc. Zoo. Soc., 1869, p. 429.

The exact position of this and the previous species needs working out with a long series of specimens. The two species will probably prove synonymous, as suggested by McCulloch (E.S.R., 1911, p. 37).

## DEEP SEA TREVALLY.

*Hyperoglyphe johnstoni*, Morton.

D. 8-1/20; A. 3/15-16; V. 1/5; P. 20; C. 30.

Height of body about one-twelfth length. Profile of head convex. Jaws almost equal. Caudal deeply forked. Colour, above blue, under silvery. Length, 500-1000 mm.

References—Morton, P. & P. Roy. Soc., Tas., 1887, p. 77. Waite, T.N.Z. Inst., xlv. (1912), p. 202, and Fishes of S.A., p. 10.

The type of this species was found washed up at Bridgewater (River Derwent), and afterwards numbers were obtained on the Tasmanian Coast. Later this species was recorded from New Zealand, and more recently, with the advent of trawling in Australian waters, many have been secured.

## SUB-ORDER PERCOIDEA.

## ENGLISH RIVER PERCH (Intro.).

*Perca fluviatilis*, Rondel.

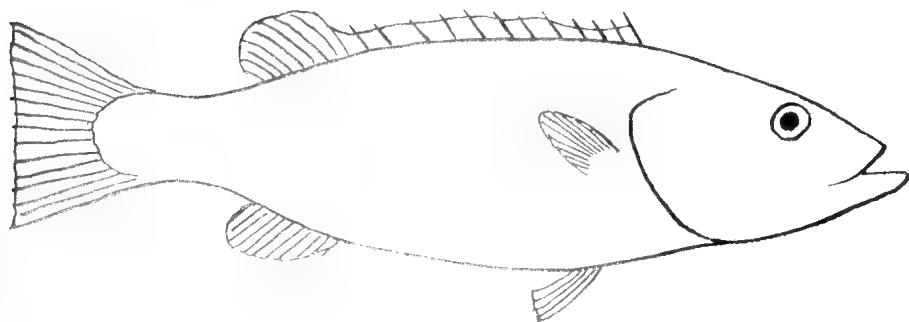
D. 14-16; 2/13-15; A. 2/8-10; L. lat. 58-67.

The English Perch, which can be recognised by the longer spinous dorsal fin and the conspicuous vertical dark bars extending from the back down the sides.

Reference—Gunther, B.M. Cat., L., p. 58.

The English Perch has been introduced into several of the Tasmanian lakes and streams.

## HAPUKU.

*Polyprion oxygeneios*, B. & S.

## Hapuku (Continued).

B. 7; D. 11-12; A. 3-9.

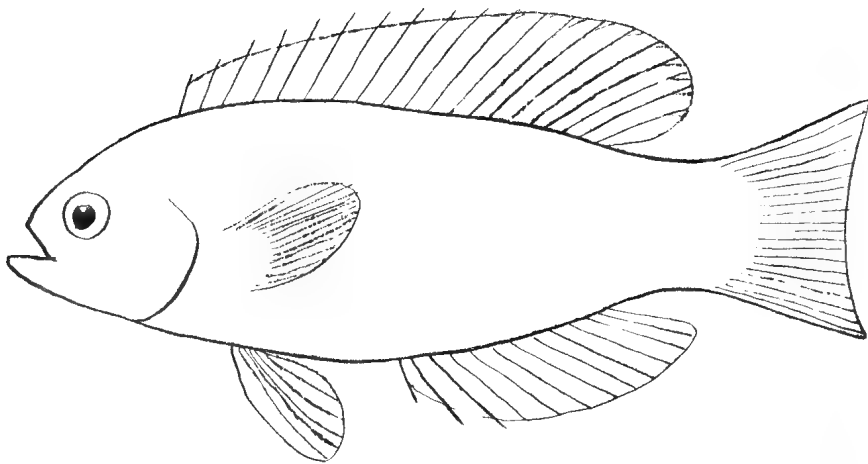
Length about three times the head. Scales small. Pectoral rounded, one dorsal. Length, up to 1800 mm. (approx. 6 feet).

References—Gunther, B.M. Cat., I., p. 251. Hector, Fishes of New Zealand, p. 102.

A New Zealand species which, so far, has only been recorded on rare occasions from Tasmanian waters. Hector (Notes on Edible Fishes of N.Z., 1872) writes as follows as regards the species in New Zealand:—"The first on the list of marketable fishes is the Hapuku, or Whapuku of the Maoris (*Oligorus gigas*) or Habuka, as the name is generally pronounced by Europeans. It is also occasionally called the Cod Fish, which is altogether erroneous, as it is more properly the representative of the Sea Perch (*Seranus*), of European Seas. The fish has a peculiar interest from its close affinity to the famous Murray Cod, which inhabits the rivers in the interior of Australia." Mr. W. Gates states that he has secured specimens of this fish from off Tasman Island.

## ALLPORT'S PERCH.

*Callanthias allporti*, Gunther.



D. 11/10; A. 3/10; V. 1/5; P. 21; C. 15.

Height of body is one-third, length of head one-fourth, of length (without caudal). Dorsal spines slender, gradually increasing in length. Caudal emarginate. Colour, reddish golden, fins yellow. Length, 200-300 mm.

References—Gunther, Ann. Mag. Nat. Hist., 1876, XVII., p. 390. Bonlenger, B.M. Cat. Fish (1895), p. 335, pl. XV.

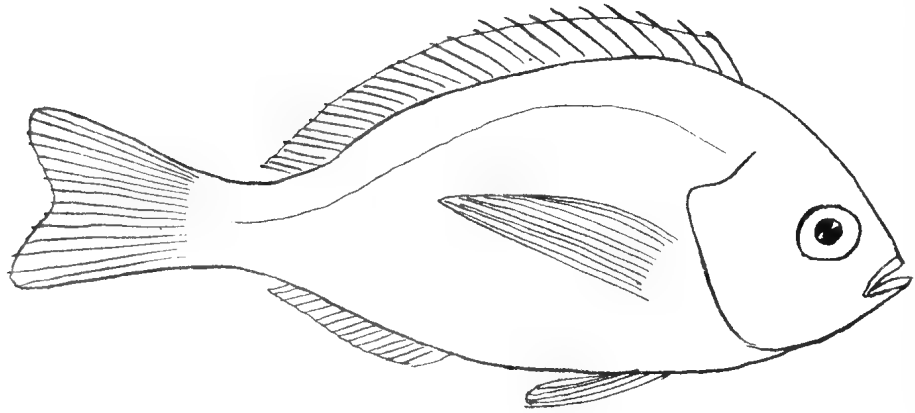
In describing this species Dr. Gunther remarked, "The occurrence of the genus in the Tasmanian seas is another interesting instance of the affinity of the Antarctic and European fish faunas."



## BUTTERFLY PERCH.

*Cæsioperca lepidoptera*, Forster. (*Anthias richardsonii*, Gunther.) ..

(*Scorpiis hectori*, Hutton.)



D. 10/19-21; A. 3/9-10; V. 1/5; P. 16; C. 18.

Depth of body  $2\frac{1}{2}$  times of total length. Reddish purple above, yellow below. A bluish streak below eye, and a blackish spot on each side below lateral line and behind extremity of pectoral. Length, 200-300 mm.

References—Boulenger, B.M. Cat. Fish (1895), I., p. 312. Waite, Fishes of S.A., p. 116.

Johnston (P. & P. Roy. Soc., Tas., 1882, p. 109) drew attention to the similarity between *C. rasor* and *S. hectori* of Hutton. Hutton's species has since been shown to be identical with *C. lepidoptera*, which Johnston apparently confused with the following species, as he omitted *C. lepidoptera* from his list.

## RED PERCH, or TASMANIAN BARBER.

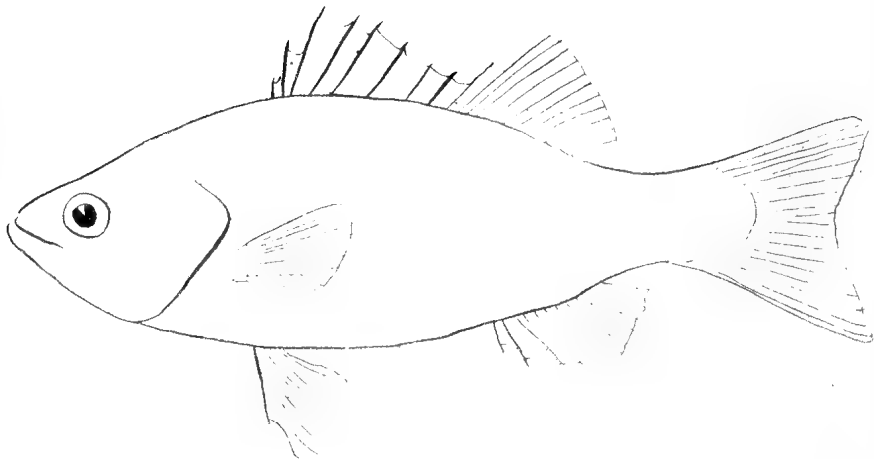
*Cæsioperca rasor*, Rich.

D. 10/19-21; A. 3/9; V. 1/5; P. 15; C. 15; L. lat. 50-55.

Body elongate. Pectorals large, being about one-quarter length of fish. Caudal forked. Colour, reddish purple on back, with more or less distinct golden stripes, a bluish streak below eye, and a vertical black bar on each side, and covered by extremity of pectoral. Length, 200-250 mm.

References—Boulenger, B.M. Cat. Fish (1895), I., p. 313. Waite, Fishes of S.A., p. 115.

## BRACKISH WATER PERCH.

*Percalates colonorum*, Gunther.

D. 8-10/9-11; A. 3/7-9; P. 14-16; C. 17; L. lat. 48-55.

Body compressed. Scales rather large. Depth of body  $2\frac{1}{2}$ -3 times total length. Colour, olive above, silvery below. Length, 400-450 mm.

References—Boulenger, B.M. Cat. Fish (1895), I., p. 132. McCoy, Prod. Zoo., Vic., pl. 14.

This species is found in the North-East portions of Tasmania.

*Nannoperca tasmaniae*, Johnston.

D. 8-1/7-8; A. 3/8; V. 1/5; L. lat. 28-30.

Body compressed. Colour, dark olive, with pinkish streak along the sides from shoulder to tail. Under silvery. Eye blue, with gold streak. Length, 75-100 mm.

Reference—Johnston, P. & P. Roy. Soc., Tas., 1882, p. 110.

A small species about three inches long, which is common in certain of the Northern rivers. Probably synonymous with *N. australis* (see Waite, Rec. S.A. Mus., II., p. 94-95).



From a drawing by Mr. Alcock

Black and Silver Pout (*Dactylopterus macropodus*).

Tasmanian Museum



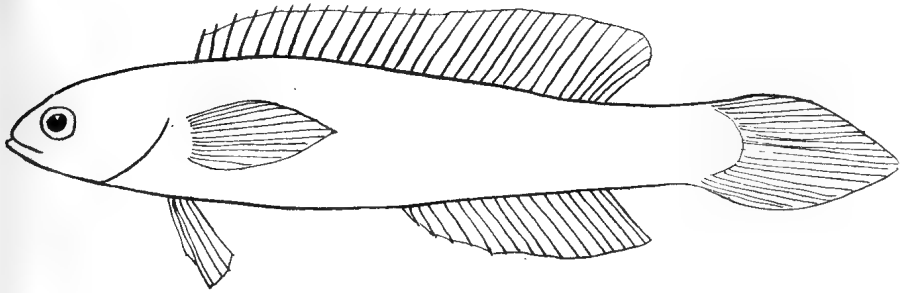
From a drawing by Mrs. Meredith

Bastard Trumpeter (*Ladrolapsus forsteri*)

Tasmanian Museum

# BLOTCHED-TAILED TRACHINOPS.

*Trachinops caudomaculatus*, McCoy. (*Pseudorhombus rodwayi*, Johnston).



D. 14, 17; A. 3/16; P. 16; V. 1/4; C. 24.

Body oblong, moderately compressed dorsal, and anal fins long. Back dark brown, becoming lighter on sides. A dark blotch at base of tail. Caudal and posterior portion of dorsal tipped orange yellow. Length, 75-100 mm.

Reference—McCoy, Prod. Zoo., Vic., II., pl. 194.

This small fish is found in many places, including the West Coast. It was first recorded from Tasmania by Johnston (from specimens secured by L. Rodway), who described it as a new species, but it is undoubtedly *T. caudomaculatus* of McCoy.

## FAMILY APOGONIDÆ.

The representatives of this family in Tasmania are small fishes a few inches long. The following may be mentioned:—

*Apogon fasciatus*, Shaw.—The Soldier Fish of N.S.W. (not the "Soldier" Fish of Tasmania, Ref. McCulloch, "Endeavour" Scientific Results, 1915, p. 116).

*Apogon novæ-hollandiæ*, Val.

*Apogon lemprieri*, Johnston. (Ref. P. & P. Roy. Soc., Tas. 1882, p. 142.)

## OPLEGNATHUS.

*Oplegnathus conwayi*, Rich.

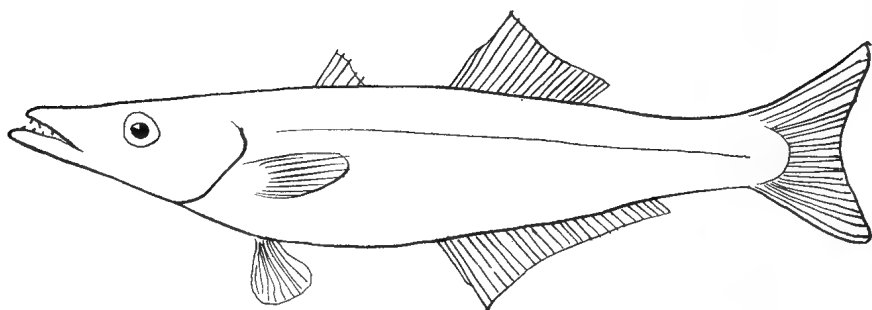
D. 12/12; A. 3/12.

Body compressed and elevated, covered with very small ctenoid scales. Spinous dorsal, with twelve spines, soft dorsal and anal rather elevated.

References—Richardson, P.Z.S., 1840, p. 27. Gunther, B.M. Cat., III., p. 357.

The type locality of this species is Port Arthur, S.E. Tasmania.

## LONG-FINNED SEA PIKE.

*Dinolestes lewini*, Griff.

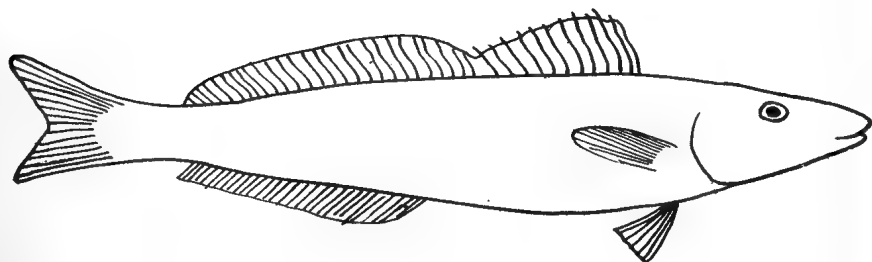
D. 5/1/18-19; A. 2/25-26; V. 1/5; P. 16; C. 17.

Body compressed. Head pointed. Length of body about five times the height. Two separate dorsal fins, the anterior one being small and short, the posterior long and high. Colour, upper brownish grey, merging into whitish on under surface. Second dorsal and caudal yellowish. Length, 400-500 mm.

References—McCoy, Prod. Zoo., Vic., pl. 115. Gunther, A.N.N.H., 1872, X., p. 183 (*L. mordax*).

"This fish was first technically described in 1834. It was not again noticed until 1872, in which year it was thrice described and named as follows:—By Klunzinger, in Germany, as *Dinolestes muelleri*; by Castelnau, in Australia, as *Neospyræna multiradiata*; and by Gunther, in England, as *Laniperca mordax*"; E. R. Waite.

## SPOTTED WHITING.

*Sillaginodes punctatus*, Cuv. & Val,

## Spotted Whiting (Continued).

D. 12-1/26; A. 2/22; V. 1/5; P. 14; C. 17.

Dorsal fins join at base. Length of body about eight times height. Body with numerous black dots above lateral line. Fins immaculate. Length, up to 500 mm.

References—Gunther, B.M. Cat., II., p. 245. Stead, Ed. Fish, N.S.W., p. 66, pl. XXXVI. Waite, Fishes of S.A., p. 123.

## TRUMPETER WHITING.

*Sillago maculata*, Quoy. & Gaim.

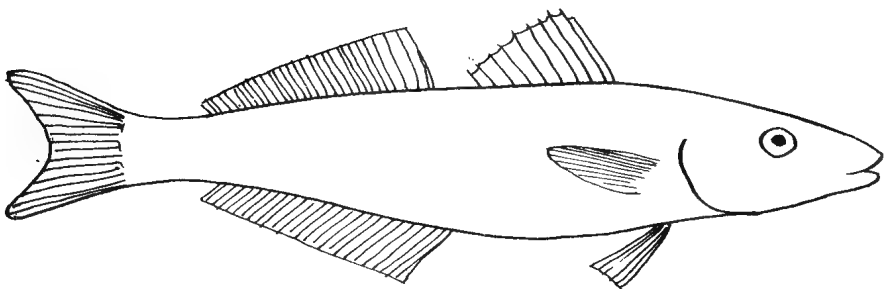
D. 11-1/20; A. 1/21; L. lat. 70.

Body somewhat cylindrical elongate. Height of body is 5 and 1/3 of total length, length of head four times. A yellow longitudinal band and seven or eight blackish blotches on each side. The second dorsal dotted with blackish spots. Length, 300 mm.

Reference—Gunther, B.M. Cat., II., p. 245. Stead, Ed. Fishes, N.S.W., p. 64, pl. XXXIV.

## SCHOOL WHITING.

*Sillago bassensis*, Cuv. & Val.



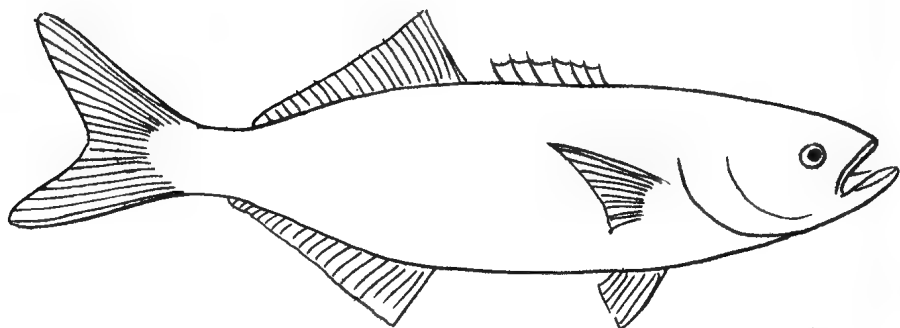
D. 11 1/17-18; V. 1/5; P. 14-15; C. 17.

Height of body  $5\frac{1}{2}$  in total length. length of head four times. Ventral spine feeble. Colour, upper sandy, under lighter, the whole tinged silvery, with opalescent tints. A longitudinal streak, and a series of reddish blotches on upper part of each side, the first dorsal marbled with blackish, the second with four or five series of oblong spots. Iris, dark blue, with golden ring. Length, 250 mm.

References—Gunther, B.M. Cat., II., p. 245. Stead, Ed. Fish, N.S.W., p. 65, pl. XXXV.

Very common in the Derwent at certain times of the year.

## TAILOR, or SKIPJACK.

*Pomatomus saltatrix*, Linn.

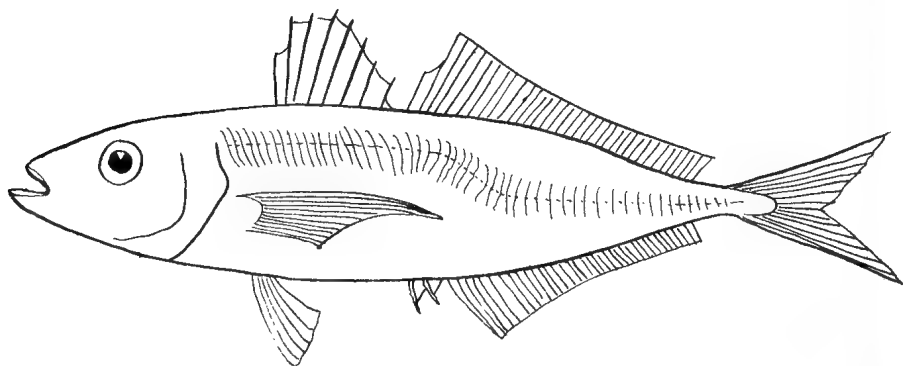
D. 7-8  $1\frac{1}{4}$ -26; A. 1-2  $1\frac{1}{2}$ -28; V.  $1\frac{1}{5}$ ; P. 17; C. 17; L. lat. 90-100.

Body oblong, compressed, covered with cycloid scales. Jaws with series of strong teeth. Dorsal spines feeble. Colour, above greenish, under silvery. Length, up to 900 mm.

Reference—Gunther, B.M. Cat., II., 479.

A cosmopolitan species, occasionally captured in Tasmanian waters. It is a very swift swimming fish of carnivorous habit, and it does considerable destruction among schools of mullet, etc.

## SCAD ("Yellow-tail" of N.S.W.).

*Trachurus declivis*, Jenys.

D. 8.1/30-35; A. 2.1/25-31; V.  $1\frac{1}{5}$ ; P. 21; C. 17.

Body elongate, but shorter and more compressed than *T. novæ zealandiæ*. Lateral line with sudden downward bend, beginning in a line with the fifth ray of the second dorsal series, and again advancing to horizontal position opposite the



ninth ray of second dorsal. Laminae of lateral line keeled, and with spines towards caudal extremity. Upper yellowish green, under silvery, various golden and pink tinges. Length, 325 mm.

References—Jenys, Zoo. Beagle Fish, Volume III., p. 68, pl. XIV. McCulloch, "Endeavour" Scientific Results, 1915, IV., p. 125.

This species is the "Yellow Tail" of New South Wales. It should not be confused with the fish usually known in Tasmania as Yellow Tail (*Seriola grandis*).

#### COWANYOUNG (of New South Wales).

*Trachurus novæ zeelandiæ*, Rich.

D. 8.1/30-35; A. 2.1/28-30; V. 1/5; P. 21; C. 17.

Body elongate and cylindrical. Length, about five times depth. Lateral line with gradual downward slope, commencing approximately in line with second dorsal. Colour, upper dark greenish-blue or bronze green. Under silvery, various golden and pinkish tinges. Length, 450 mm.

References—Richardson, B.A.S., 1843, p. 21. *T. trachurus*, McCoy, Prod. Zoo., Vic., I., pl. 18.

This fish, known in New South Wales as the "Cowanyoung," is often referred to as the "Horse Mackerel" in Tasmania, but this designation belongs to one of the true mackerels (*Sarda chiliensis*).

#### SILVER TREVALLY.

*Caranx georgianus*, Cuv. & Val.

D. 8.1/26-29; A. 2.1/22-24; V. 1/5; P. 19; C. 17.

Body elongate. Snout long and pointed. Adipose eyelid well developed. A series of stout conical teeth in each jaw. Body covered with small scales. Lateral line broadly arched anteriorly. A strong spine, partly hidden, precedes dorsal fin, third dorsal spine longest. Pectoral falcate. Caudal deeply forked. Colour silvery, upper blue, with dark spot on opercle. Length, 500-700 mm.

References—McCulloch, "Endeavour" Scientific Results (1915), III., p. 126. Waite, Fishes of S.A., p. 126.

#### PILOT FISH.

*Naucrates ductor*, Linn.

D. 3-6 1/26/28; A. 2/16-17.

Body oblong. A keel on each side of tail. Spinous dorsal reduced to few free spines. Colour, bluish, with darker back. Length, up to 610 mm. (2 feet).

Reference—Gunther, B.M. Cat., II., p. 374.

The Pilot Fish, which is fairly frequently observed in Tasmanian water, is a cosmopolitan oceanic species frequenting most of the seas of the world. It was designated the Pilot Fish because it is usually found in company with a shark, and was supposed to pilot the latter. The association of the two species, however, almost amounts to commensalism, as the Pilot Fish feeds on parasites that infest the shark, and also on the remnants of the shark's meals. Kershaw has recorded (Victorian Naturalist, XXVIII. 1911), p. 94) this species as having been met with in company with the Basking Shark and the Leathery Turtle.

## TASMANIAN YELLOW TAIL (King Fish of N.S.W.).

*Seriola grandis*, Castel.

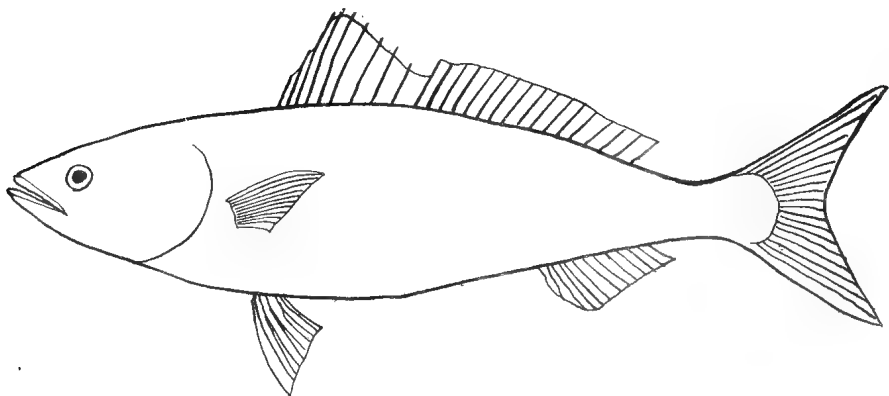
D. 6-7/1/32-35; A. 1/20; P. 21; V. 1/5; P. 21; C. 17.

Body slender and compressed, closely covered with small cycloid scales. Spinous dorsal commencing above middle or hinder part of pectorals. Pectoral short. Caudal deeply forked. Colour, upper dark bluish black, under silvery, a yellow stripe along centre of body. Length, up to 1800 mm., but the average size taken is much smaller.

References—McCulloch, "Endeavour" Scientific Results (1915), III., p. 121. Waite, Fishes of S.A., p. 124.

A fish with a wide geographical distribution, and known under various vernacular designations in many parts of the world, being a pelagic species and a powerful swimmer. It appears more often in Bass Straits than in the Southern waters of Tasmania.

## AUSTRALIAN "SALMON" (Colonian "Salmon").

*Arripis trutta*, Bloch & Schn.

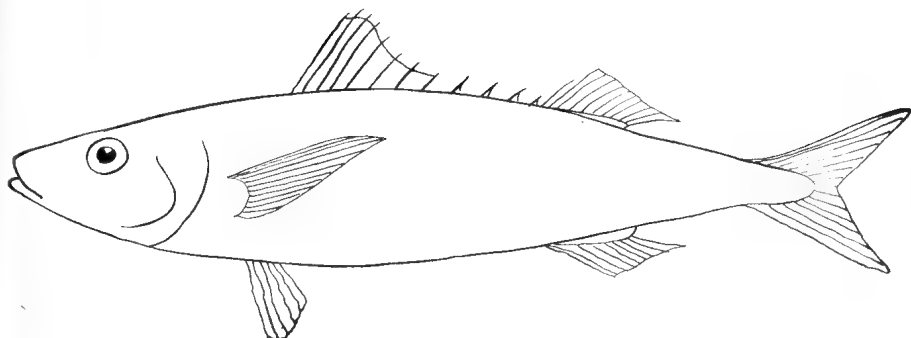
D. 9/16-17; A. 3/10; A. 3/10; V. 1/5; P. 16; C. 17; L. lat. 48-52.

Body moderately elongate. Caudal deeply forked. One dorsal anterior portion with nine slender spines. Spines moderate. Colour variable. In young specimens the general colour is silvery, back greenish, with olive bars and markings and yellow spots on sides. The mature forms are darker, the general colour greenish olive without the bars and spots of the immature form. Length, up to 750 mm.

Reference—McCoy, Prod. Zoo., Vic., pl. 16 and 17.

The Arripis is generally known as the Native or Colonial "Salmon" among fishermen. It is a very common species.

## PEARL FISH.

*Emmelichthys nitidus*, Rich.

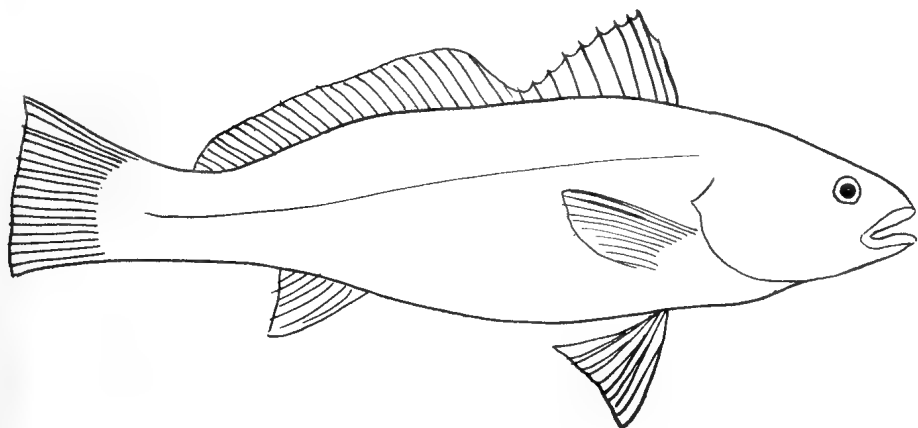
D. 13/9-10; A. 3-10; V. 1/5.

Body elongate, tapering gradually to base of caudal. Head scaly, less than one-quarter total length. Eye large. Colour, silvery. Length, 350 mm.

Reference—Richardson, Zoo., Err. & Terr., II., p. 47, pl. XXIX., figs. 7 and 8.

This species is rarely obtained in the mature state, but instances have been known of shoals of immature forms occurring off the South Coast. Mr. W. Gates, of Hobart, was the first to secure specimens of this species in Tasmanian waters.

## JEW FISH (King Fish of Victoria).

*Sciaena antarctica*, Castel.

D. 9-10 1/27-28; A. 27; V. 1/5; P. 17; C. 17; L. lat. 51-54.

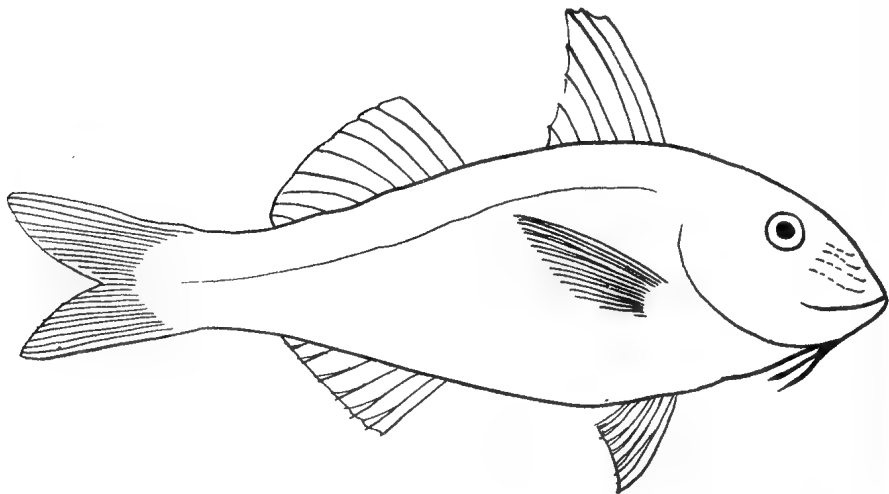
Body oblong. Colour, dark bluish green on upper parts, gradually merging to silvery white on under surface. Dorsals and caudal brown. Pectorals green. Length, up to 1800 mm.

References—Castlenau, P.Z.S., Vic., 1872, p. 100. Roughley, Fishes of Australia, pl. 35.

This species serves to form an interesting commentary on the need for scientific nomenclature. It is practically identical with the important European fish, known as the "Maigra," and its vernacular designations in Australia serve as a complete puzzle to those whose only means of identifying fish is by way of their vernacular names. In New South Wales this fish is known as the "Jew Fish." In Queensland as the "Dew Fish." In Victoria and Western Australia as the "King-fish," and in South Australia as the "Butter Fish" or "Mulloway." It is also sometimes referred to as the "Jewel Fish." This species is of voracious habit, and grows on occasions up to six feet in length. It is a rather rare species as far as Tasmanian waters are concerned.

### BLUE-STRIPED RED MULLET ("Goat Fish").

*Upeneus porosus*, Cuv. & Val.



D. 8 1/8; A. 7; V. 1/5; P. 15-16; C. 15; L. lat. 28-30.

Length three and a half to four times the height, elevated anteriorly. Barbels on chin. Colour, upper reddish purple, under silvery, narrow blue bands on each cheek, blue spots on body and fins. Iris crimson. Length, 250-300 mm.

References—Roughley, Fishes of Australia, pl. 44. Waite, Rec. S.A. Mus., II., I., p. 108.

The Blue-Striped Red Mullet, or Goat Fish, is not often taken in Tasmanian waters, but is distributed over most of the mainland coasts. It is a richly coloured species, inhabiting fairly deep water in the vicinity of rocky coasts. The narrow bright blue bands on each cheek, and the typical goatfish barbels on the chin, serve as easy identification marks.

## SNAPPER.

*Pagrosomus auratus*, B. & S.

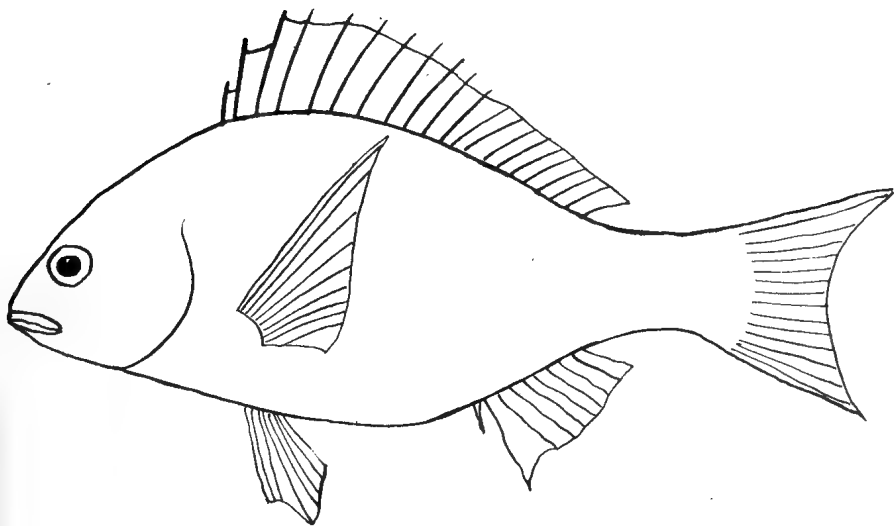
D. 12/10; A. 3/8; V. 1/5; P. 15; C. 17; L. lat. 52-55.

Body Bream-like, but shape as well as colouration depends largely upon age.

Reference—Roughley, *Fishes of Australia*, pl. 42.

The Snapper, so well known in Victoria and New South Wales waters, is only occasionally met with on the Northern and Eastern Coasts of Tasmania. Its place in our waters is taken by the Trumpeter. The very young Snapper are known to fishermen in New South Wales as "Cocknies," later as "Red Bream," and then "Squires" and "School Snapper." The fully adult female form, which possesses a large bump at the top of the head, is known as "Old Man Snapper."

SILVER BREAM (of Tasmania), (Black Bream of N.S.W. and S.A.).

*Sparus australis*, Gunther.

D. 11-12/10-12; A. 3/7-9; V. 1/5; P. 15; L. lat. 44-48.

Length of body approximately three times the height. Dorsal spines strong. General colour silvery. Upper parts greenish olive, darker on the head. Under silver white. Length, 250-500 mm.

Reference—McCoy, *Prod. Zoo., Vic., I.*, pl. 4.

This species is usually taken during the summer months in the brackish waters and creeks. The colouration is liable to variation according to habitat. It is common in many of our rivers, particularly those on the East Coast.

## BLACK BREAM (of Tasmania).

*Girella tricuspidata*, Q. & G.

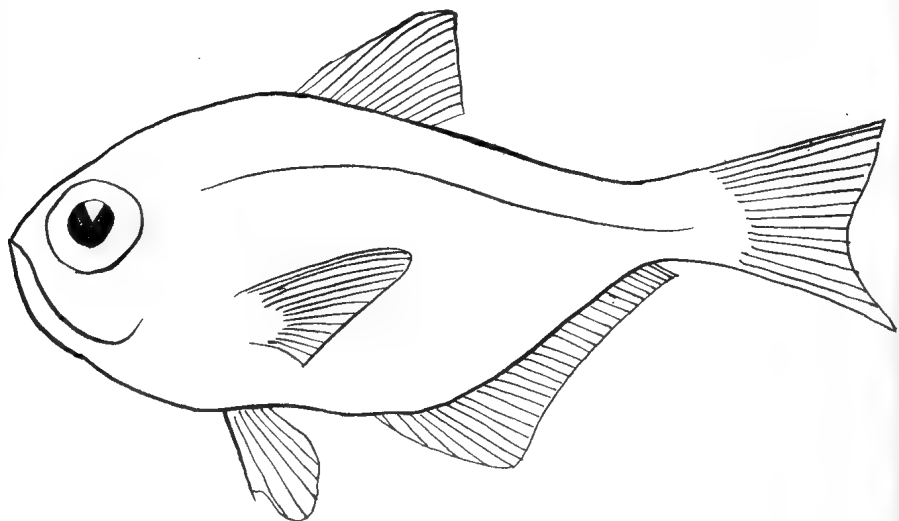
D. 15/11-12; A. 3/11-12; V. 1/5; P. 16; C. 17; L. lat. 48-51.

Cheeks scaly. Scales moderate. Dorsal fin moderately high, spinous portion lower than soft. Colour, silvery brownish black, but variable according to habitat as well as sex and age characteristics.

Reference—Richardson, Zoo. Err. &amp; Terr. Fishes, pl. 25.

This species is known in New South Wales as the Blackfish, whereas *S. australis*, which is known in Tasmania as the Silver Bream, they call the Black Bream. The species listed by Johnston (*G. simplex*) as "The Sweep," has been shown by McCulloch (Rec. Aust. Mus., 1920, XIII., p. 60) to be merely a sex and age variation of *G. tricuspidata*.

## BIG-SCALED BULL'S EYE.

*Liopempheris multiradiata*, Klun.

D. 5/11-13; A. 3/32-38; L. lat. 46-50.

Body compressed and oblong. Eye large. Scales large. Caudal fin forked. Colour, silvery brown. Length, 20 mm.

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 45.

This species is seldom taken in Tasmania. The large eyes provide the cause for the vernacular designation of Bull's eye.

## ELONGATED BULL'S EYE.

*Parapriacanthus elongatus*, McCulloch.

D. 4-5/10-12; A. 3/24-27; P. 17-18; V. 1/5; C. 17.

Anal fin with less than thirty rays. Length, 130 mm.

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 47.

## SWEEP.

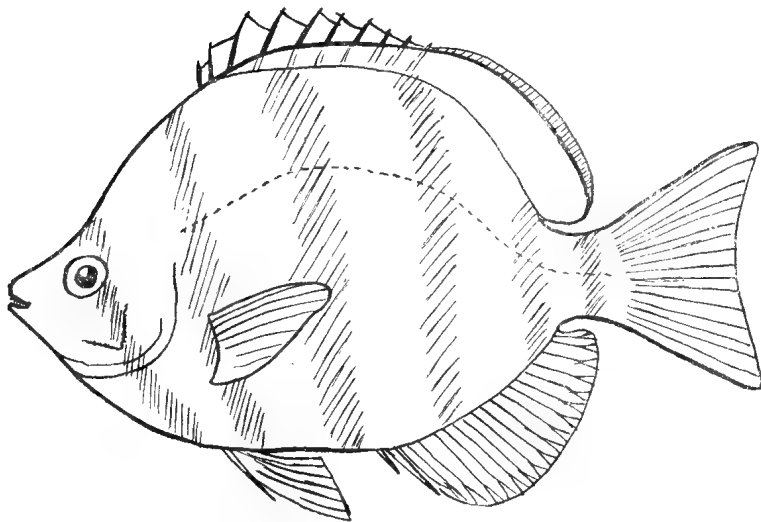
*Scorpis georgianus*, Cuv. & Val.

Body compressed and elevated. Snout moderate. Soft dorsal and anal fins falcate, the anterior rays being elevated. Colour, brownish.

References—Gunther, B.M. Cat., II., p. 64. Waite, Rec. S.A. Museum, II., p. 112. Waite, Fishes of S.A., p. 134.

This species, which is occasionally taken on the Northern Coasts, should not be confused with a variety of the Bream (*G. tricuspidata*) which is sometimes referred to as "The Sweep."

## SIX-BANDED CORAL FISH.

*Vinculum sexfasciatum*, Rich.*Vinculum sexfasciatum* Richardson X $\frac{1}{4}$ 

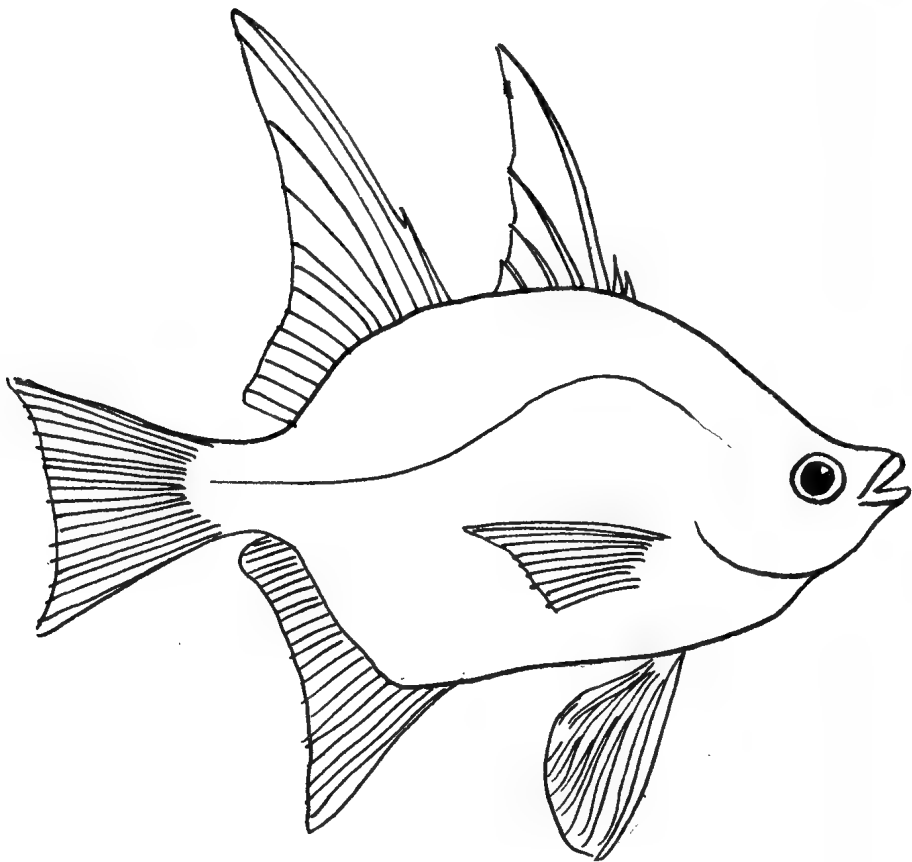
D. 10/21; A. 3/17-19; V. 1/5; P. 17; C. 17.

Body compressed. Snout slightly produced. Scales very small. Six distinct vertical bands. Length, 375 mm.

References—McCulloch, "Endeavour" Scientific Reports, 1914, II., 3, p. 110. Lord, P. & P. Roy. Soc., Tas., 1923, p. 43.

This distinctive looking species has been recorded from Western Australia, Victoria, and New South Wales (?). In June, 1923, a specimen was caught on the East Coast of Tasmania by Messrs. Dale and Davis, and forwarded to the Tasmanian Museum.

## ZEBRA FISH.

*Enoplosus armatus*, Shaw.

D.  $8\frac{1}{4}$ -15; A.  $3\frac{1}{4}$ -15; V.  $\frac{1}{5}$ ; P.  $13\frac{1}{4}$ ; C. 17.

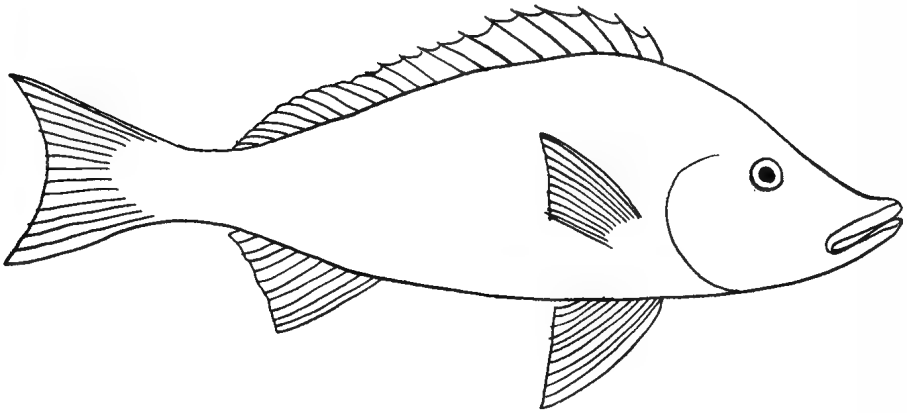
Body compressed. Length two and a half times height. Dorsal elevated. Body silvery, with eight brown vertical bands. Anterior portions of fins brown, posterior red and white. Iris golden, ringed red. Length, 250 mm. ( $9\frac{3}{4}$  inches).

Reference—Roughley, Fishes of Australia, pl. 26.

This rather peculiar looking fish is known in New South Wales as "Old Wife." It is also called the Bastard Dory, owing to its somewhat superficial resemblance to the Dory family. It is not often secured in Tasmanian waters.



## GIANT BOAR FISH.

*Paristiopterus labiosus*, Gunther.

B. 6; D. 7/17; A. 2/9-11; V. 1/5; P. 17; C. 17.

Body oblong. Head prolonged. Upper profile of head concave. General colour reddish brown to green. Iris silvery. Length, 300-400 mm.

References—Gunther, P.Z.S., 1871, p. 658, pl. 59. McCulloch, "Endeavour" Scientific Results, 1911, p. 72.

The Giant Boar Fish is a deep water species not often obtained by the ordinary fishermen.

## SHORT BOAR FISH.

*Zanclistius elevatus*, R. & O.

D. 6/25-28; A. 3/12-15; P. 14-16; K. 1/5; C. 17.

Snout concave. Lower jaw the longer. Posterior portion of anal equal to posterior portion of soft dorsal. Length, 200-300 mm.

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 67, figs. 14-18.

A deep water species, which is subject to considerable variation.

## LONG-SNOUDED BOAR FISH.

*Pentaceropsis recurvirostris*, Rich.

D. 8 1/15; A. 3/10-11; V. 1/5; P. 18.

Body oblong. Head prolonged into slightly curved snout. Length, 375-500 mm.

Reference—Richardson, Zoo. Err. & Terr., pl. XXII.

Specimens of this species are occasionally secured on the Southern Coast, and also within the River Derwent.

## MARBLED KELP FISH.

*Dactylopagrus arctidens*, Rich.

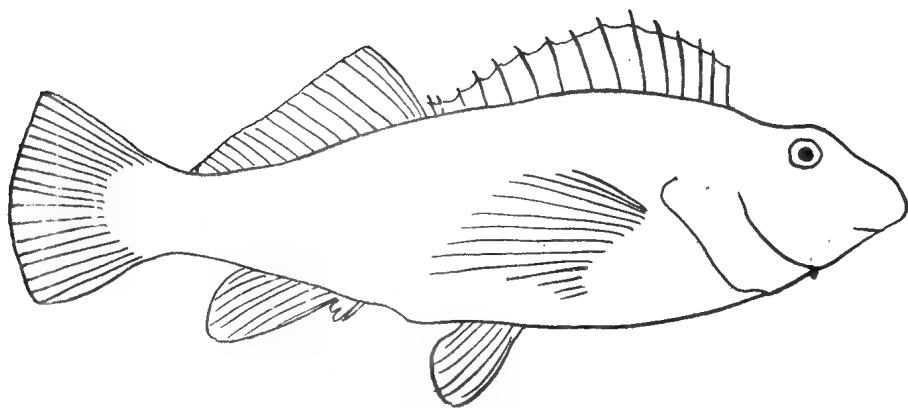
D. 15-16 1/18-20; A. 3/7; V. 1/5.

Two elongate dorsal fins. Anal short. Scales small. Teeth compressed, tricuspid. Colour brownish, marbled brown and white. Under whitish.

Reference—B.M. Cat., I., p. 435.

This species is common in many places, such as Maria Island amid the kelp, from two to five fathoms, and amid the kelp beds of the Derwent Estuary.

## LARGE KELP FISH.

*Chironemus marmoratus*, Gunther.

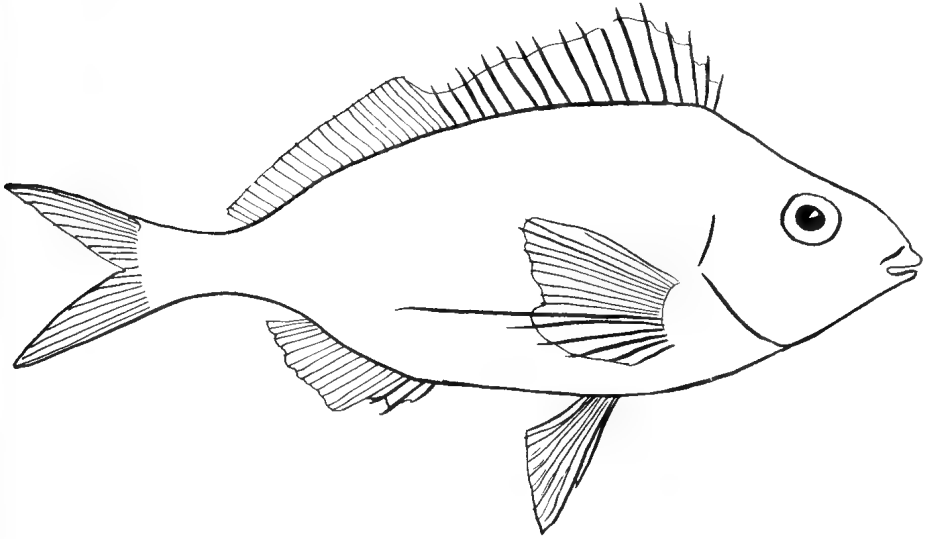
D. 15/18; A. 3/6; V. 1/5; P. 15; L. lat. 55-58.

Body oblong and slightly compressed. Eye large. Interorbital space concave. Teeth conical acute. General colour reddish brown, mottled dark brown, and covered with small white spots. Length, 355 mm. (14 inches).

Reference—Roughley, Fishes of Australia, pl. 39.

The Kelp Fish is fairly common in localities which are suitable for its mode of existence.

## BLACK AND SILVER PERCH.

*Dactylopagrus macropterus*, B. & S.

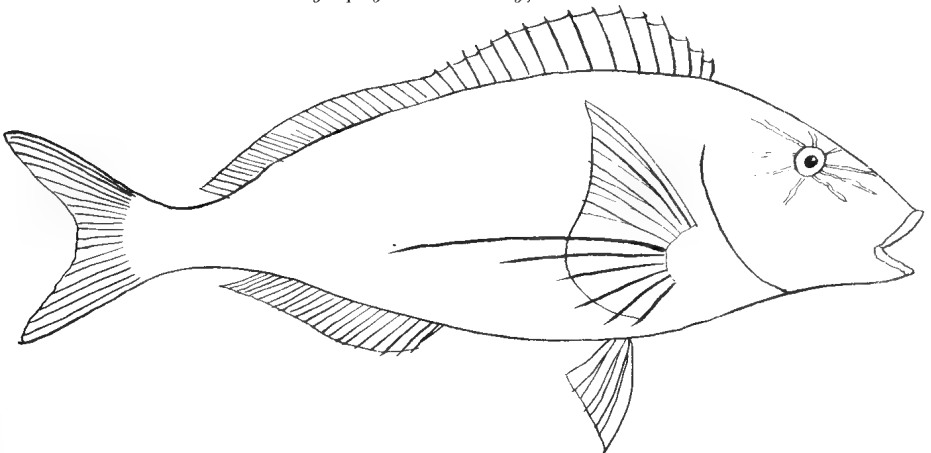
D. 17-18, 25-28; A. 3/12-14; P. 9/6.

One dorsal fin, which is notched. Six simple pectoral rays, uppermost very elongate. Caudal forked. Scales moderate. Cheeks scaly. A blackish band from origin of dorsal to shoulder and base of pectoral.

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 66, pl. XII.

A very common species, which reaches its mature state on the coastal banks. The small fish that are caught in such numbers in the Derwent and other rivers are merely the immature form of this species, which is known in New South Wales and South Australia as the Jackass Fish. In New Zealand it is referred to as the "Tarakihi."

## MORWONG, or GREAT PERCH.

*Dactylopagrus morwong*, R. & O.

## Morwong or Great Perch (Continued).

D. 17/32; C. 17; A. 3/19; V. 1/5; P. 15.

Body compressed. Sixth pectoral ray from bottom very long. Colour variable, slatey blue or brown on upper surface, whitish below. Numerous yellow lines and markings on head and snout. Iris yellow. Length, 500-800 mm.

Reference—McCoy, Prod. Zoo., Vic., pl. 173, 174.

This species, which inhabits the outer banks, is sometimes confused with the previous species, but the absence of the bluish purple "shoulder strap" is a ready means of identification. It does not frequent the estuaries in the same manner as the Black and Silver Perch.

## BUTTER FISH (of Tasmania).

*Dactylophora nigricans*, Rich.

D. 15/16; A. 3/10.

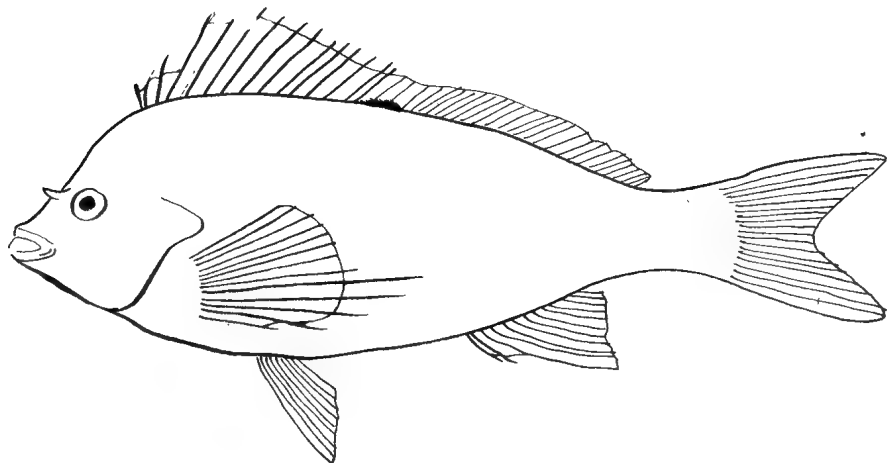
One dorsal fin. Five simple pectoral rays, the uppermost one the longest. Sixth dorsal spine the longest. Colour, bluish grey, with several brownish bands and spots under surface paler. Length, up to 900 mm. (35½ inches).

References—Richardson, P.Z.S., 1850, p. 63. P. & P. Roy. Soc. Tas., April, 1884, p. LXV. Waite, Fishes of S.A., p. 146.

This species is known in New South Wales as the Dusky Morwong, and in S. Australia as the Strong Fish, or Tillywurti.

## MAGPIE PERCH (of Tasmania).

*Goniistius vizonarius*, Kent.



D. 17-18/25-30; A. 3/9-10; V. 1/5; L. lat. 65-68.

Length of body a little more than two and a half times the height. Conical projection in front of eye. Colour silvery, with dark vertical band anteriorly, and often one or two bands posteriorly in front of eye. Length, 300-400 mm.

Reference—McCulloch, "Endeavour" Scientific Results, 1911, p. 64, pl. XL.

The Magpie Perch is fairly common in certain localities around the coast. The differences between this form and the mainland fish of the same vernacular name were first drawn attention to by Saville Kent (P. & P. Roy. Soc. of Tas., 1887, p. 47).

CARP (of Tasmania), (Brown-Banded Morwong of N.S.W.).

*Cheilodactylus spectabilis*, Hutton.

D. 17/25-30; A. 3/9.

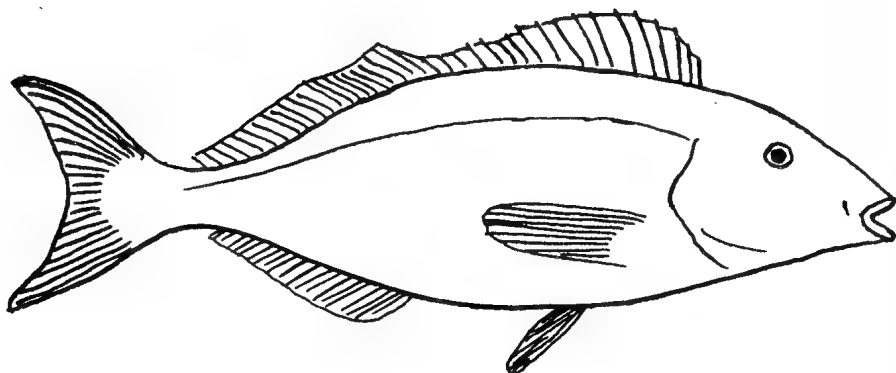
One dorsal fin. Six simple pectoral rays, the upper one the longest, not so long as head. Dorsal deeply notched, the fourth, fifth, and sixth spines the longest. Colour, upper yellowish orange, with six more or less distinct bands. Under paler. Dorsal blackish. Length, 400-600 mm.

Reference—Hutton, Fishes of New Zealand, p. 8.

This species is fairly common around the Southern Coasts of Tasmania.

### REAL TRUMPETER.

*Latris lineata*. B. & S.



D. 17.1/36-38; A. 3/28-30; P. 9/8-9.

Length four times length of head. Dorsal fin deeply notched. Colour, upper greenish, with three dark green longitudinal bands, under white. Length, up to 800 mm.

Reference—Richardson, Trans. Z.S., 1842, III., p. 106, pl. 6.

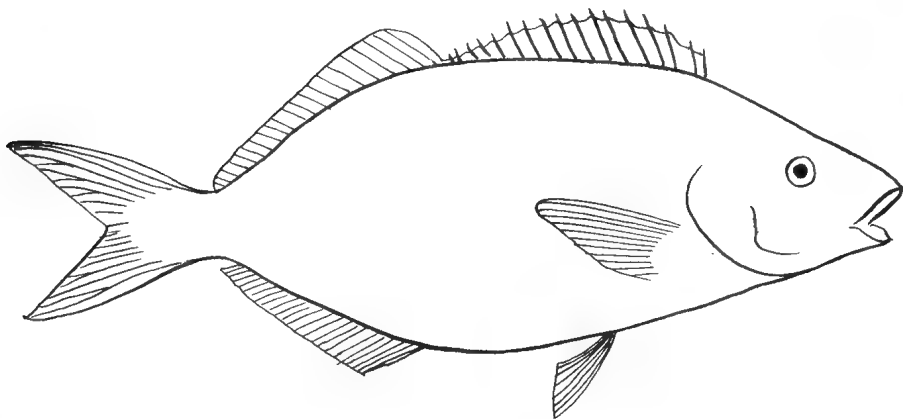
The Real or Tasmanian Trumpeter, which is often referred to as "The Strikey" on account of the stripes on the sides, is one of the choicest of the edible fishes of Tasmania. The younger fish are often caught in the estuaries and bays, but the mature forms frequent the banks off the coast.

### BASTARD TRUMPETER.

*Latridopsis ciliaris*, Forster.

Further research is needed in order to place this species satisfactorily, owing to its similarity with *L. fosteri*. Johnston omitted it from his 1882 list, but later he secured specimens from George's Bay, which he definitely identified as *L. ciliaris*, and therefore included it in his list of 1890. A specimen of this species was also exhibited at a meeting of the Royal Society of Tasmania held in September, 1884. All specimens from Tasmanian waters examined by us have been *L. fosteri*.

## RED, WHITE, AND SILVER BASTARD TRUMPETER.

*Latridopsis forsteri*, Castelnau.

D. 16.1/37-42; A. 3/33-36; P. 9-10/8-9; L. lat. 115-120.

Body compressed. Length slightly more than three times height. Colour variable, according to age. Length, 300-400 mm.

References—Castelnau, P.Z., Vict., 1872, p. 77. McCulloch, "Endeavour" Scientific Results, 1915, p. 146.

The Bastard Trumpeter is common in suitable localities. The young or Red Bastard Trumpeter are often netted in the keup beds of the estuaries, but the mature White or Silver form frequents the deeper water, and only moves into the shallows at spawning time. Unlike the Real Trumpeter, it will rarely take bait, and nets are the means of capture.

## REAL BASTARD TRUMPETER.

*Mendosoma allporti*, Johnston.

B. 6; D. 23.1/25-26; A. 3/18-19; P. 15-16; L. lat. 72-74.

Body compressed. Head pointed, cheeks scaly. One dorsal fin deeply notched, the sixth, seventh, and eighth rays longest. Caudal forked. Colour uniform, blackish grey. Length, 300-400 mm.

Reference—Johnston, P. & P. Roy. Soc., Tas., 1880, p. 54.

This species frequents the moderately deep water of the East Coast, and is occasionally captured in the estuary of the Derwent.

## VICTORIAN ROCK PERCH.

*Glyphisodon victoriae*, Gunther.

D. 13/17; A. 2/15; P. 19; V. 1/5.

Height of body slightly less than half length. One dorsal fin, the soft portion higher than spinous. Pectorals large. Ventrals large. Length, 200-250 mm.

Reference—Castelnau, P.Z.A.S., Vic., 1872, I., p. 146.

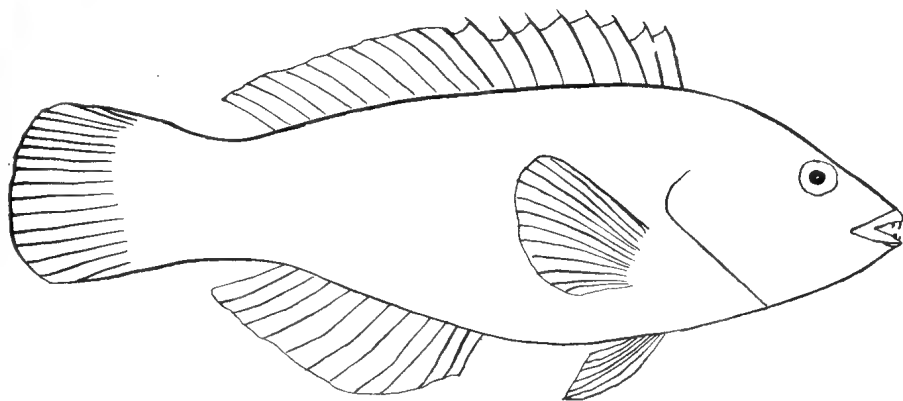
This species, which is also known as the Sealy Fin, is only caught in Tasmanian waters on rare occasions.

## FAMILY LABRIDÆ (Parrot Fishes).

The Parrot Fishes are usually brightly coloured forms, which have certain teeth coalesced as to form beaks—hence the name “Parrot Fish.” The following occur in Tasmania :—

## LILAC-BANDED PARROT FISH.

*Pseudolabrus tetricus*, Rich.



D. 9/11; A. 3/10.

Body oblong and compressed, covered with large scales. A posterior canine tooth. Colour variable, usually reddish banded with purplish markings.

References—McCulloch, Rec. Aust. Mus., 1913, IX., p. 377, pl. 19. McCulloch, “Endeavour” Scientific Results, 1911, p. 76, pl. XIII.

A very variable species growing to about 45 mm. (1 $\frac{3}{4}$  inches) long.

## ROSY PARROT FISH.

*Pseudolabrus psittaculus*, Rich. (*Labricthys mortoni*, Johnston.)

D. 9/11; A. 3/10; V. 1/5; P. 12; C. 12; L. lat. 25-26.

Body oblong, compressed, covered with large scales, which extend over base of caudal fin. Colour pink, with large yellow spot in centre of each scale on sides. Head and back darker. Length, 150-220 mm.

References—Richardson, P.Z.S., 1840, p. 26. and Voy. Err. & Terr. Fishes, p. 129, pl. 56 (7-10). Waite, Rec. S.A. Museum, II., p. 128.

## BLOTCHED PARROT FISH.

*Pseudolabrus celidotus*, Rich.

D. 9/10; A. 3/10; P. 12; C. 1/5.

General colour greenish. A dark blotch on side, generally near centre of lateral line. Length, up to 225 mm.

References—Richardson, Voy. Err. & Terr., p. 53, pl. XXXI. Waite, Fishes of S.A., p. 152.

## PURPLE PARROT FISH.

*Pseudolabrus fucicola*, Rich.

D. 9/11; A. 3/10; V. 1/5; C. 14.

General colour, purplish, with yellow markings. Length up to 300 mm.

Reference—Richardson, Voy. Err. &amp; Terr. Fishes, p. 127, pl. 154.

## PURPLE BANDED PARROT FISH.

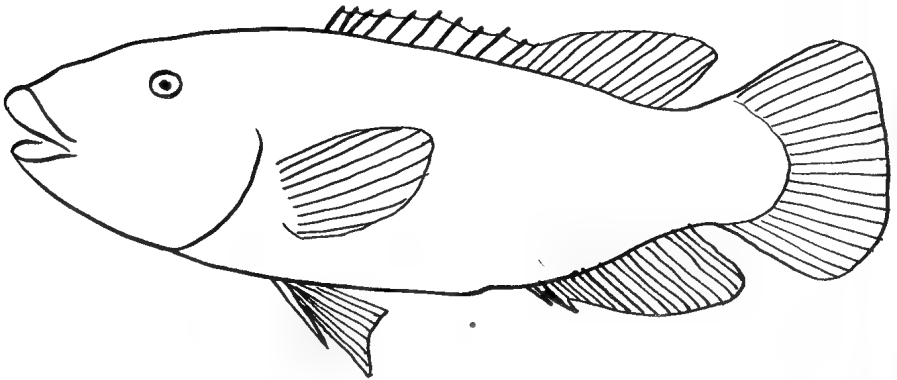
*Pictilabrus laticlavus*, Cuv. & Val.

D. 9/11; A. 3/10.

Colour green, with two purple longitudinal bands. Length. up to 200 mm.

Reference—Richardson, Voy. Err. &amp; Terr. Fishes, p. 128, pl. 156 (f. 3-6).

## GROPER.

*Achaerodus gouldii*, Rich.

D. 11/10-11; A. 3/11; V. 1/5; P. 16; C. 14.

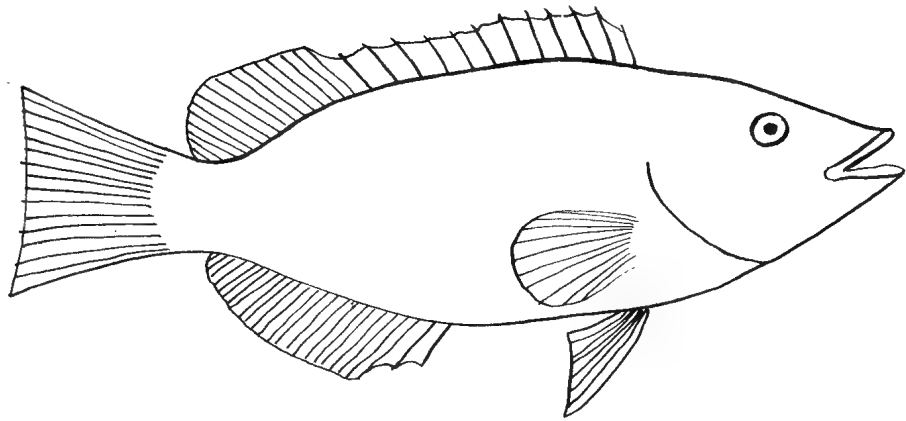
Body compressed and oblong, with scales of moderate size. Lips thick and fleshy. Colour, variable from blue to red, generally purplish blue in adult. Length, up to 1000 mm. (3 feet 3 in.).

Reference—Roughley, Fishes of Australia, pl. 48 and 49.

The Groper is a common species around the rocky section of the coast.



## PIG FISH.

*Verreo oxycephalus*, Bleeker.

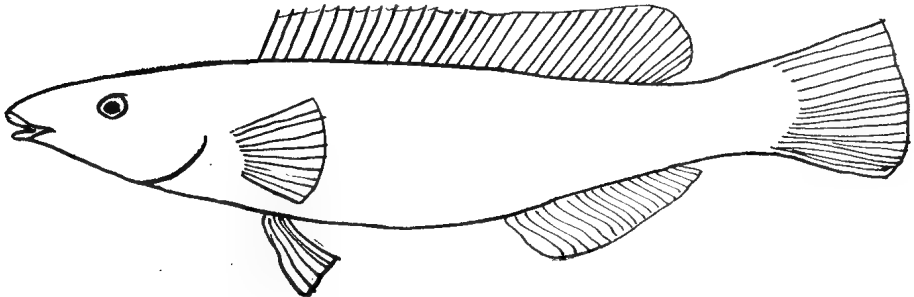
D. 12/11; A. 3/12; V. 1/5; P. 17; C. 14.

Body oblong and compressed. Snout pointed. General colour reddish, deepest on back. A deep bluish black spot between sixth and ninth dorsal spines. Under paler. Iris orange. Length, 38 mm. (1.5 inches).

Reference—Roughley, Fishes of Australia, pl. 51.

The Pig Fish, which is a fine edible species, is not at all common in Tasmanian waters. The pointed snout is the cause of its vernacular designation.

## ROCK WHITING.

*Neoodax semifasciatus*, Cuv. & Val.

D. 16-17/13-14; A. 3/11-12; V. 1/4; P. 14; C. 12.

Body elongate. Snout conical, cheeks scaly. Scales rather small. Colour subject to variation, but often greenish, with dark brownish markings on back. Under pinkish. Cheeks with orange streaks. Iris crimson. Length, 250-400 mm.

References—Castelnau, P.Z.A.S., Vic., 1872, I., p. 152. Roughley, Fishes of Australia, p. 55.

The Rock "Whiting" is generally known to the Tasmanian fishermen as the "Stranger," a vernacular designation which is also applied to it in Victoria. It is occasionally taken in D'Entrecasteaux Channel and other Tasmanian localities.

#### LITTLE ROCK WHITING ("Ground Mullet").

*Neodax balteatus*, Cuv. & Val.

D. 15-17/12-13; A. 3/12-13; L. lat. 38-39.

Snout conical. Cheeks scaly. Scales rather small. Sides of head with red and blue streaks. Dorsal and anal fins with dark purplish edges. Length, 175 mm.

Reference—Richardson, A.M.N.H., 1840, p. 26.

Both Macleay and Steed have stated that this species is known as the "Kelp Fish" in Tasmania, but we are unaware of the slightest justification for such a statement. We have heard it referred to by fishermen as the "Ground Mullet."

#### PIGMY ROCK WHITING.

*Neodax beddomei*, Johnston.

D. 20-12; A. 3/9; L. lat. 40.

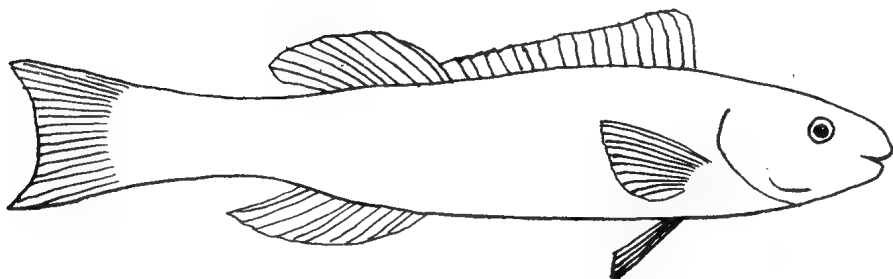
Body elongate. Snout produced, and fairly pointed. Eye rather large. Height of body one-tenth total length. Colour of body and fins reddish. A well marked black streak extending over five of upper rays of caudal fin. Length, 120 mm. ( $4\frac{3}{4}$  inches).

Reference—Johnston, P. & P. Roy. Soc., Tas., 1882, p. 231-232.

We have been unable to trace Johnston's type, which was apparently not preserved, nor have we been able to secure further specimens.

#### HERRING CALE.

*Olisthops cyanomelas*, Rich



D. 18/9-10; A. 3/9; P. 11; V. 5; C. 12-13.

Body rather elongate and compressed. Upper jaw overhanging lower. Anal similar in form to soft dorsal. Colour variable, the male is usually blackish, and the females brownish, with blotched markings. Length, 300-450 mm. (12-18 inches).

References—Richardson, P.Z.S., 1850, p. 75. McCulloch, Rec. Aust. Mus., 1920, XIII., p. 69, pl. 14.

Johnston (P. & P. Roy. Soc., Tas., 1883, p. 193) described a specimen (T.M. No. 10,932) of this variable species from Table Cape, and designated it *Olisterops browni*. McCulloch has shown (Rec. Aust. Mus., 1920, XIII., p. 69) that Johnston's species is synonymous with above. The Herring Cale is a rock fish, which is occasionally taken on our Northern coasts. Specimens have also been obtained from the East Coast.

### RIVER BLACKFISH.

*Gadopsis marmoratus*, Rich.

D. 10-13/25-28; A. 3/17-19; V. 1; P. 15; C. 16.

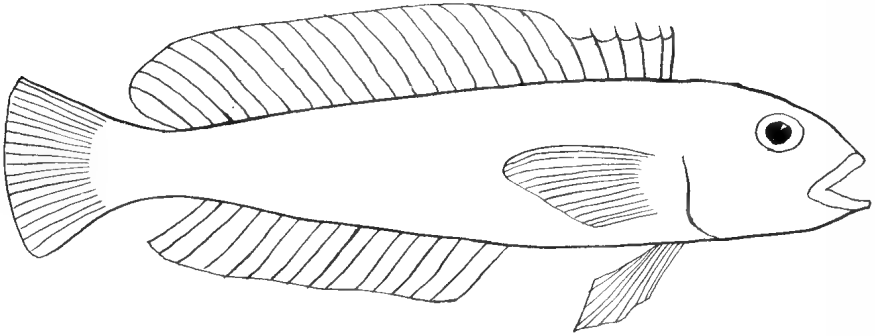
Body slightly elongate, covered with very small scales. Colour, upper blackish, marbled grey, the under surface lighter. Length, up to 500 mm.

References—Günther, B.M. Cat., IV., p. 318. Waite, Fishes of S.A., p. 161.

The Blackfish is found in the Northern rivers flowing into Bass Straits. It has been introduced into several other localities; for instance, Saville Kent introduced it into the Derwent.

### BARRED GRUB FISH.

*Parapercis allporti*, Günther,



D. 5/21; V. 1/5; P. 19; L. lat. 62.

Body cylindrical and elongate. Scales small, ctenoid. Snout longer than eye, which is one-quarter of length of head. Spinous dorsal continuous with soft. Colour, brown above, with dark brown bars, under whitish. Length, 330 mm.

Reference—Waite, Mem. Aust. Mus., 1899, pl. 24, and Fishes of S.A., p. 163.

This species is occasionally taken in the Derwent and other rivers, but its true habitat is the deep water off the coast.

### CATFISH, or STONELIFTER.

*Kathetostoma læve*, Bl.

D. 17; A. 17.

Body elongate. No scales. One continuous dorsal, the spinous portion less developed than the soft part. Eyes on upper surface of head, which is large, and about three and two-thirds of total length, which may be up to 500 mm. (19½ inches).

Reference—Waite and McCulloch, Trans. Roy. Soc., S. Aust., 1915, pl. 13.

This species, which is variously called the "Cat Fish," "Stonelifter," or "Star-gazer," is occasionally taken among the Southern estuaries, but appears to be more plentiful in the North.

### FRESH WATER FLATHEAD ("Sandy").

*Pseudaphritis urvillii*, Cuv. & Val.

D. 7-8/19-22; A. 21-25; C. 14.

Body elongate and somewhat cylindrical. Scales small, two separate dorsals. Colour, darkish above, lighter below. Dark blotches on back. Length, up to 250 mm. (10 inches).

References—Gunther, B.M. Cat., II., p. 242. Waite, Rec. S.A. Mus., II., p. 141.

The Fresh Water Flathead is fairly common in many Tasmanian rivers, particularly those on the East Coast. Specimens have recently been taken by Mr. J. R. Crane in New Town Creek, near Hobart. Known in S. Australia as Congolli. Waite (Fishes of S.A., p. 165) draws attention to the habit of this species of being able to live in either salt or fresh water.

### DRAGONET.

*Bovichthys variegatus*, Cuv. & Val.

D. 8/18-19; A. 18; V. 1/5; C. 17.

Above mottled dark brown, under silvery. Length, 280 mm. (11 inches).

Reference—Waite, Fishes of S.A., p. 165.

A Southern species. Immature examples are often taken in the Derwent Estuary.

### PAINTED DRAGONET.

*Callionymus papilio*, Gunther.

D. 4/7-8; A. 6-8; C. 11.

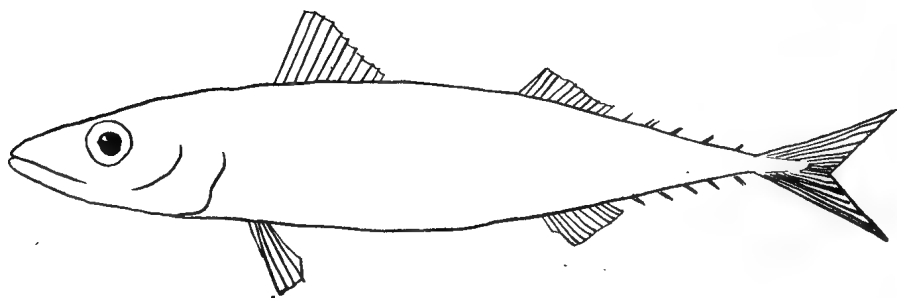
Head triangular, depressed. Two dorsal fins, with long rays. General colour reddish yellow, with numerous markings, including white spots on fins. Length, 140 mm. (5½ inches).

References—Gunther, A.M.N.H. (1864), XIV., p. 197. Macleay, Cat. Aust. Fish, p. 262 (No. 541 and 543).

Recorded as *C. lateralis* by Johnston, which is synonymous with *C. papilio*.

### MACKEREL.

*Scomber colias*, Gmelin.



## Mackerel (Continued).

D. 10-12 1/11 and V-VI.; A. 1 1/11-12 and V-VI.; V. 1/5; P. 21; C. 17-19.

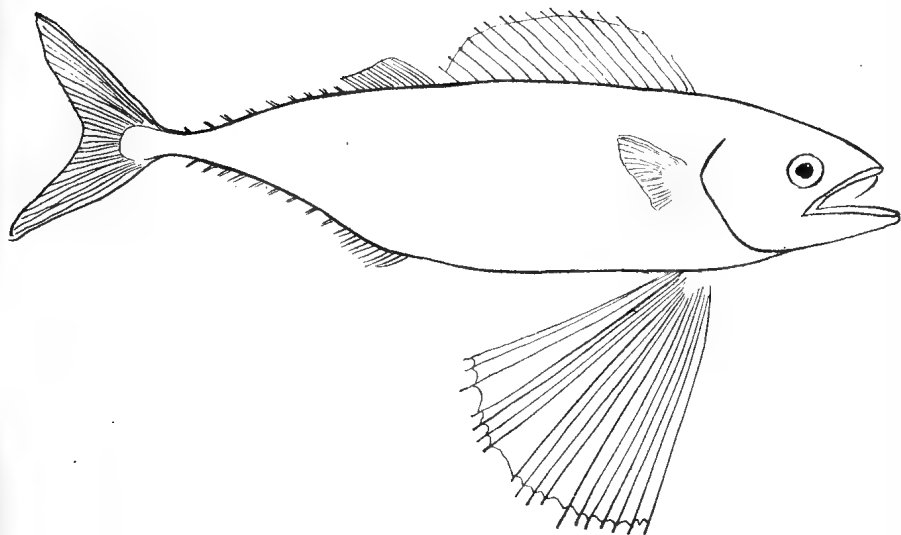
Body elongate and compressed. Two dorsal fins. Length five and a half times height. Colour, upper greenish blue, streaked darker. Under silver white, tinged pink, with numerous spots and streaks of grey blue. Length, 350 mm.

Reference—Roughley, Fishes of Aust., pl. 56.

The Mackerel occasionally occurs in shoals off the coasts.

## BUTTERFLY FISH.

*Gasterochisma melampus*, Rich.



D. 17 1/10 and VI.; V. 1/5; P. 21; L. lat. 64.

Body mackerel shape, but variable according to age. Ventrals large and wing-like. Length, up to 1500 mm.

Reference—Richardson, Voy. Err. and Terr., II., pl. 37.

This rare oceanic species has been taken in Storm Bay, at the entrance to the Derwent, but it appears to be a pelagic species, not often taken on our coasts.

## FRIGATE MACKEREL.

*Auxis thazard*, Lacop.

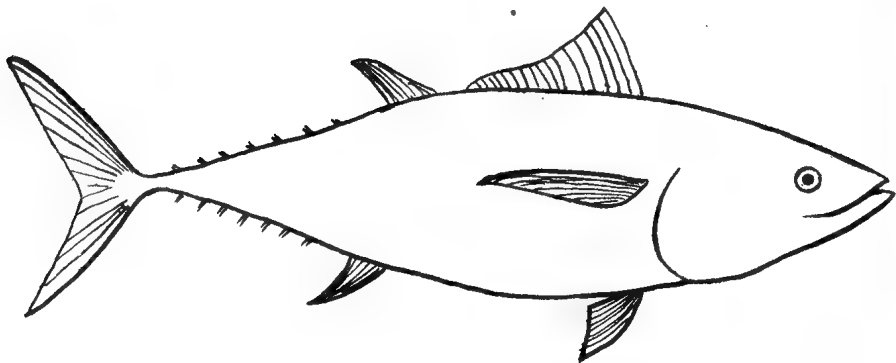
D. 10-11/12 and VIII.; A. 12-14 and VI.

Body oblong. Cleft of mouth wide. A longitudinal keel on each side of tail. Height of body equals length of head. Pectoral reaches to end of first dorsal. Colour, upper dark blue, variegated or else uniform dark blue (mature form), under silvery. Length, about 375 mm.

Reference—Gunther, B.M. Cat., II., p. 369 (*Auxis rochei*).

A cosmopolitan oceanic species often occurring in shoals. It is not often taken in Tasmania, but specimens have been secured in Ralph's Bay, River Derwent.

## SOUTHERN TUNNY (Tuna).

*Thunnus thynnus*, Linn.

D. 13-15 1/13-15 and VIII-IX.; A. 12-14 and VIII-IX.; V. 6-7; P. 30-34.

Body stout, tapering each way from pectoral. Cleft of mouth wide. Colour, upper blue-black, under silvery. Length, up to 2000 mm.

Reference—Waite, Fishes of S.A., p. 166.

An ocean species, occasionally captured in the estuaries. It is practically identical with the American Tuna.

## HORSE MACKEREL.

*Sarda chiliensis*, Cuv. & Val.

D. 16-18 2/12 and VIII.; A. 2-3/9-10 and VII-X.

Body slightly elongate. Cleft of mouth wide, spines of first dorsal weak, membrane deeply notched. Ventral small. Pectoral pointed. Colour, upper bluish, under silvery.

Reference—Day, Fishes of India, pl. LVI.

The fish usually called a Horse Mackerel in Tasmania is one of *Carangidae*, and not a true mackerel. The widely distributed *S. chiliensis* is generally known in other countries as the Horse Mackerel, and in order to obtain similarity of the vernacular nomenclature we have retained the designation. The species occasionally appears on our East Coast.

## SWORD FISH.

*Tetrapturus indicus*, Cuv. & Val.

D. 42-47/7; A. 12/6.

Body elongate, upper jaw conical, and very produced. Length, up to 4575 mm. (15 feet).

Reference—McCulloch, Rec. Aust. Mus., 1921, XIII., p. 4.

The first record of this species for Tasmania was a specimen secured at North Bay (Lagoon Bay), on the East Coast. It may be mentioned that North Bay is a good collecting ground, as Whales, Seals, etc., are occasionally washed up here. The Sword Fish is but a rare visitor to our coastal waters.

## FROST FISH.

*Lepidopus caudatus*, Euph.

D. 102-104; A. 24-25; V. 41-47.

Body very elongate. Cleft of mouth wide. One single dorsal along whole of back. Caudal well developed. Scales, none. No keel on tail. Colour, uniform silvery. Length, 1600 mm.

Reference—Gunther, B.M. Cat. II., p. 344.

The Frost Fish, or Scabbard Fish, as it is sometimes called, is a cosmopolitan species only occasionally taken in Tasmanian waters.

## KING BARRACOUTA ("King Fish" of Tasmania).

*Jordanidia solandri*, Cuv. & Val.

D. 17-18 1/17-18 and I-II.; A. 1/13-18 and II.

Body rather elongate. Cleft of mouth wide. Ventral reduced to single spine. Length, 750 mm.

Reference—Waite, Rec. Cant. Mus., 1913, p. 236, pl. LII.

The King Barracouta is known in Tasmania as the "King Fish." This must not be confused with the "King Fish" of Victoria or the "King Fish" of New South Wales, which are entirely different fishes. This serves to show the uselessness of vernacular designations, whereas the scientific name is world-wide. At one time these fish were abundant in Tasmanian waters, and constituted one of the chief food fishes, but they are now seldom caught.

## BARRACOUTA.

*Thyrsites atun*, Euph.

D. 20 12/5; A. 12/6.

Body elongate and compressed. Cleft of mouth wide. Teeth strong. Upper mandible projecting. Colour, blue or black, silvery on sides. Length, 1200 mm.

Reference—McCulloch, Rec. Aust. Mus., 1821, XIII., p. 138, pl. XXIV. (2).

The Barracouta occurs in shoals in the estuary of the Derwent and off the South and East Coasts. They are caught by means of "jigs," and provide an abundant harvest to fishermen.

## FAMILY GOBIIDÆ (Gobies).

The Gobies are fishes of small size. The following have been recorded from Tasmania:—

## TAMAR GOBY.

*Gobius tamarensis*, Johnston.

B. 4. D. 6 1/8; A. 1/8; L. lat., 32.

Reference—Johnston, P. &amp; P. Roy. Soc., Tas., 1882, p. 120.

Probably identical with the following species:—

## SPOTTED GOBY.

*Gobius lateralis*, Macleay.

Reference—Macleay, P.L.S., N.S.W. Cat. Fish, No. 485.

## GIRDLED GOBY.

*Gobius hinsbyi*, McCull & Ogilby.

References—P. & P. Roy. Soc., Tas., 1902, P.X. (name only). McCulloch & Ogilby, Rec. Aust. Mus., XII., p. 215, pl. XXXIII. Waite, Fishes of S.A., p. 170.

FAMILY *BLENNIDÆ* (Blennies).

The Blennies are mostly fishes of small size, having more or less elongate bodies. The dorsal and anal fins are long, caudal being distinct.

The following may be mentioned:—

*Blennius tasmanianus*, Rich. (Blenny or "Bully").

D. 12/17-18; A. 2/19; V. 2; P. 14.

Length, 120 mm.

Reference—Richardson, Trans. Zoo. Soc., III., p. 129.

*Clinus perspicillatus*, Cuv. & Val. (Eyed Blenny).

D. 33-35/4; A. 2/25; V. 1/3.

Length, 100 mm.

Reference—Gunther, B.M. Cat., II., p. 271.

*Clinus johnstoni*, Saville Kent (Johnston's Blenny).

D. 2-3 32-33/5; A. 2 25-26; V. 3.

Reference—Type in Tasmanian Museum.

*Cristiceps australis*, Cuv. & Val. (Weed Fish).

D. 3 27-29/8-5; A. 2/23-25; V. 1/3.

Length, 230 mm.

Reference—Gunther, B.M. Cat., III., p. 275.

*Cristiceps forsteri*, Casteln. (Forster's Blenny).

D. 3 29/4; A. 26.

Reference—Casteln. P.Z.S., Viet., I., p. 132.

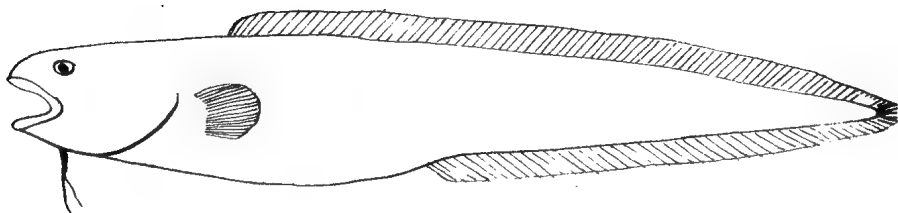
*Gillius clarkii*, Morton (Clark Blenny).

Length, 80 mm.

Reference—P. &amp; P. Roy. Soc., Tas., 1912, p. 82.

SUB-ORDER *OPHIDIROIDÆ*.

## LING.

*Genypterus blacodes*, B. & S



## Ling (Continued).

D. 159; A. 123-126; P. 19-21.

Body cod-like, elongate, tapering to point at caudal extremity. Dorsal merges into anal. Pectoral small. Colour, upper reddish brown, sides lighter, blotched darker, under whitish. Length, 750 mm.-900 mm.

Reference—McCoy, Prod. Zoo., Vic., plate 27 I.

The Ling is occasionally captured in the Derwent Estuary and other localities.

## ORDER DISCOCEPHALI (Sucker Fishes).

The fishes of this order have elongate bodies, with tough leathery skins, with a sucking attachment on the top of the head. These fishes attach themselves to whales, sharks, etc., and even boats, and are thus carried about without effort to themselves. They do no harm to the animal to which they attach themselves, and are not parasitic like the Lampreys, as the sucker is not portion of the mouth.

*Echeneis naucrates*, Linn. (Slender Sucker Fish).

A cosmopolitan species, with a long slender tail. Grows to 900 mm. in length.

*Remora remora*, Linn. (Short Sucker Fish).

Another cosmopolitan species. Length, 300 mm.

## ORDER SCLEROPAREI (Gurnets, &amp;c.).

The fishes of this order are distinguished by the fact that a projection of the suborbital bone extends across the cheek towards the preoperculum.

## COMMON RED GURNET.

*Scorpena cruenta*, Richardson.

D. 12/10; A. 3/5; V. 1/5; P. 17; C. 18.

Head large, armed with spines, a naked groove on occiput. Eyes large. Colour reddish, marbled darker. Black spot between 8 and 9 dorsal spine. "Forty-five or less scales in row below lateral line" (McCulloch). Length, 300-400 mm.

References—Gunther, B.M. Cat., II., p. 112. Richardson, A.M.N.H., 1842, p. 217.

The Gurnets of Tasmania are known in New South Wales and South Australia as "Red Rock Cod," whereas in Tasmania we apply the name Rock Cod solely to a very different type of fish. This fish frequents rocky situations, and is common around our coasts.

This species is identical with *S. militaris*, Rich. (Err & Terr., p. 22, pl. 14, fig. 1-2 and *S. ergastulorum*, Rich. the "Port Arthur Scorpena"—described in Ann. Mag. Nat. Hist., 1842, p. 217.

## RED GURNET.

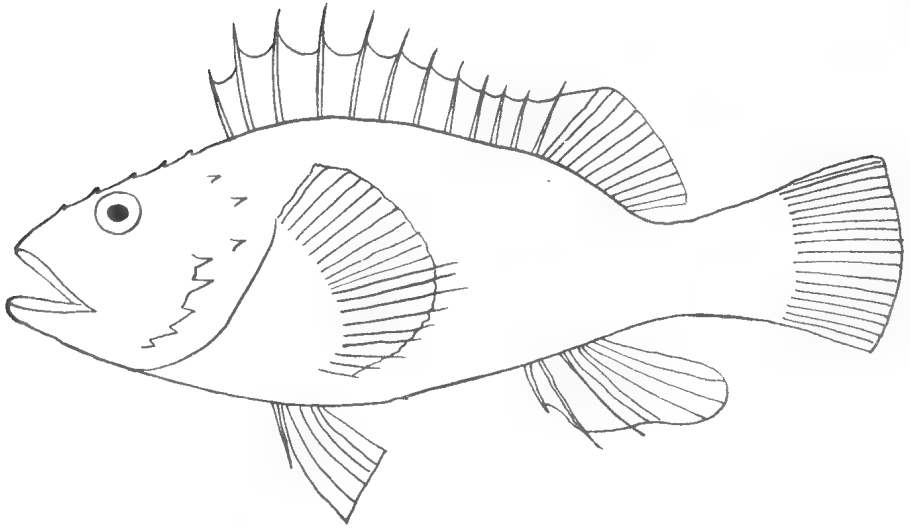
*Scorpena cardinalis*, Rich.

D. 12/10; A. 3/5; V. 1/5; P. 17; C. 14.

50-55 scales in a row below lateral line.

References—McCulloch, Fishes of N.S.W., p. 90. Roughley, Fishes of Australia, p. 178, pl. 62.

## RED GURNET PERCH.

*Helicolenus percoides*, Rich.

D. 11 1/12; A. 3/5; P. 18; C. 13.

Head and body compressed. No groove on occiput. Third and fourth dorsal spines the longest. Operculum with spines. Colour variable, general colouration reddish, marked brown, under surface paler. Fins tinged orange.

References—Gunther, B.M. Cat., II., p. 101. McCoy, Prod. Zoo., Vic., pl. 33.

This species differs from the previous species (*Scorpana*) in having the lower portion of the operculum scaly.

## SPOTTED GURNET PERCH.

*Neobastes scorpanoides*, Guichenot.

D. 13/8; A. 3/5; V. 1/5; P. 22; C. 25.

Both head and body covered with rough scales. Thirteen dorsal spines. Colour, upper reddish purple, under lighter, with various darker spots. Fins spotted and barred with reddish brown.

Reference—McCoy, Prod. Zoo., Vic., pl. 193.

This species can be distinguished from allied forms by the absence of the spines to the pectoral fin, as all rays are branched. It also lacks the darker cross bands.

## ROUGH GURNET PERCH.

*Neobastes thetidis*, Waite.

D. 13/9; A. 3/5; V. 1/5.

Head large, and with numerous spines. Eyes large. A large flattened spine on clavicle, above origin of pectoral. Spinous dorsal strong, the fourth spine the longest. Anal commences beneath twelfth dorsal spine. Colour, above reddish brown with darker blotches. Pinkish below. Dorsals, pectorals, and caudal yellowish, with green markings. Pectoral pink. Length., 150-350 mm.

References—Waite, Mem. Aust. Mus., 1899, IV., p. 100. McCulloch, "Endeavour" Scientific Results, 1915, p. 154.

McCulloch states that this species is very abundant in waters 60-100 fathoms deep off the East Coast of Tasmania.

## SADDLE SKULL GURNET.

*Neosebastes panda*, Rich.

D. 12 1-8; A. 3/5-6; V. 1, 5; P. 20; C. 23.

Head large, armed with spines, a naked groove on occiput. Anterior part of spinous dorsal very high, spines nearly free. General colour reddish, with minor markings. Head and back dotted with black, caudal with two broad blackish cross bands. Length, 300-400 mm.

Reference—Richardson, Ann. Mag. Nat. Hist., 1842, p. 216.

This species was called the "Saddle-skull Scorpaena" by Dr. Richardson on account of the upward projection of the orbit and the saddle-like project behind.

## GOBLIN FISH.

*Glyptauchen panduratus*, Rich.

D. 17/7; A. 3/6; P. 14; V. 1/5; C. 12.

Orbit extremely elevated, with deep depression posteriorly before commencement of dorsal spine. Dorsal continuous, with the last six or seven rays elevated. Length, 150 mm.

Reference—Richardson, P.Z.S., 1850, p. 58, pl. L. (3-4).

A peculiar looking fish of small size, which is occasionally caught in rocky situations.

## FORTESQUE (of N.S.W.).

*Centropogon australis*, Gunther.

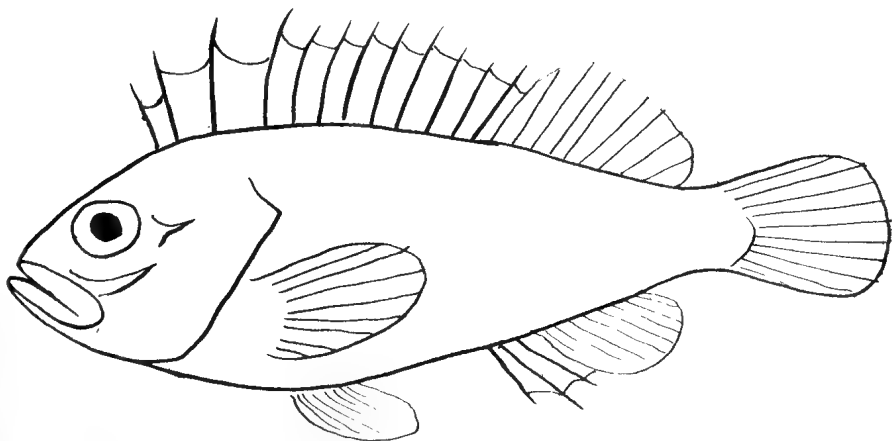
D. 15/9; A. 3/5.

Head and body compressed. One continuous dorsal. Scales very small. Third dorsal spine longest. Colour reddish brown, with irregular dark cross bands, Length, 150 mm.

Reference—Waite, Mem. Aust. Mus., 1899., p. 103, pl. 21.

This species is occasionally taken on the N.E. Coast. Its habits are somewhat similar to the following species, and it has the same power of stinging by means of its venomous spines.

## SOLDIER (of Tasmania).

*Pentaroze marmorata*, Cuv. & Val.

## Soldier (Continued).

D. 12-13/10; A. 3/6; V. 1/5; 5 P. 12; C. 12.

Head and body compressed, without scales. Pre-orbital spine long and dagger shaped. Dorsal begins on neck. Colour yellowish, marbled brown. Length, 150 mm.

References—Gunther, B.M. Cat., II., p. 132. Waite, Fishes of S.A., p. 167.

This species is fairly common, and is well-known on account of the painful wounds which it can inflict by means of eucite spines, particularly those dagger-like spines on each side of the snout. In S. Australia this fish is known in the vernacular as the Cobbler.

## RED VELVET FISH.

*Gnathanacanthus gætzeei*, Bleeker.

D. 7-8 3-5/10; A. 9; C. 12-14; V. 1/5.

Body compressed, covered with minute granular appendages, giving the skin a velvet-like touch. Colour, rich red or reddish purple. Length, 250-300 mm.

References—Johnston, P. & P. Roy. Soc., Tas., 1882, p. 114. Ogilby, Papers & Proc. Roy. Soc., Tas., 1896, p. 82.

This fish attracts attention because of its rich red colouration and the "velvet-like" skin. Some years ago numbers of specimens used to be forwarded to the Tasmanian Museum for identification, but of recent years only a very few specimens have been received.

## WARTY PROW FISH.

*Patæcus maculatus*, Gunther.

D. 31-32; A. 11-12; P. 8; C. 9.

Colour olive, with darker spots. Length, 150-175 mm.

References—Waite, Rec. S.A. Museum, p. 169, and Fishes of S.A., p. 194. Johnston, P. & P. Roy. Soc., Tas., 1890, p. 33 (*P. armatus*).

A small fish, recognisable by the continuous dorsal, with prow-like anterior portion, the whole body having a "warty" effect.

## BUTTERFLY GURNARD (of Tasmania).

*Paratrigla vanessa*, Rich.

D. 11/17; A. 17; V. 1/5; P. 11-3; C. 13.

Upper surface and sides of head long. Scales regular, of moderate size, those of the lateral line with distinct spines. Snout short, upper profile concave. Pectoral spotted, and reaches to seventh anal ray. First dorsal with broad black spot, edged with white. Pectotal green, with black spot, edged blue and white. Iris yellow. Length, 250 mm.

References—Gunther, B.M. Cat., II., p. 197. Waite, Fishes of S.A., p. 203.

The type of this species was secured at Port Arthur. It is not very often obtained.



From a drawing by Mrs. Meredith

PLATE 110. 110 m. 110 m. 110 m.

Red Velvet Fish (*Gnathopneustes virens*)

Tasmanian Museum

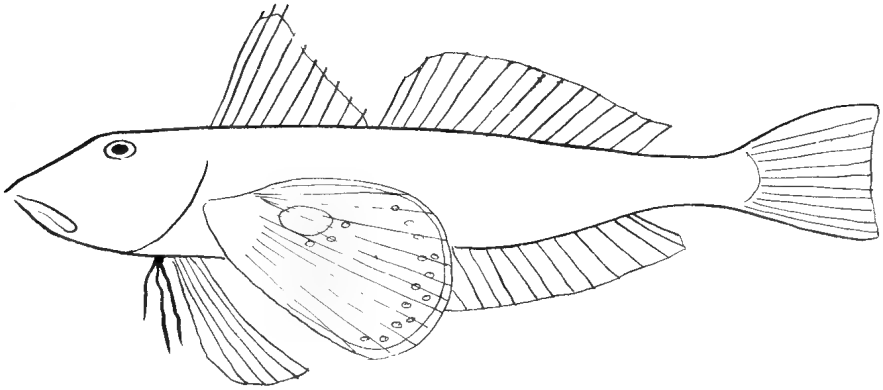


From a drawing by Mrs. Alcott.

*Burtonia (Thygesia) atun*

Eastman Museum

## KUMU GURNARD.

*Chelidonichthys kumu*, Less. & Gar.

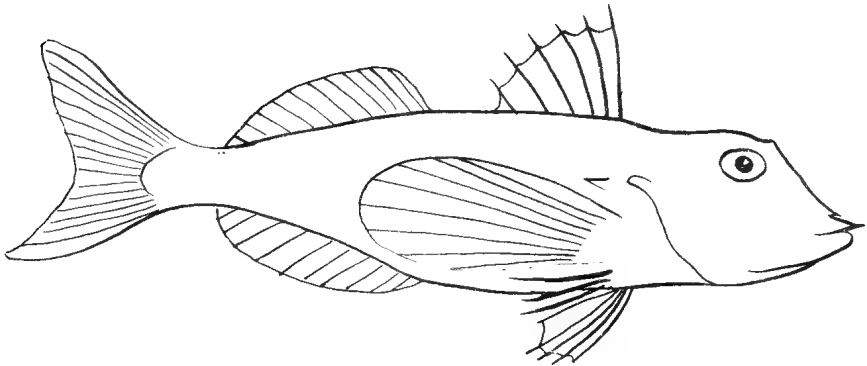
D. 9-10/16-17; A. 15; P. 10; V. 6; C. 14.

Sides and upper surface of head bony. Two dorsals, first much shorter than second. General colour, upper brownish red, blotched with darker brown, under surfaces lighter, tinged with red. Pectoral brownish red on under surface, upper bright olive green, fringed blue, the whole fin covered with blue spots. There is also a large black blotch on lower posterior half of pectoral fin. Length, 400-500 mm.

Reference—Gunther, B.M. Cat., II., p. 204.

This fish is only rarely captured in Tasmanian waters. Its habit of frequenting rocky ground would also serve to render its capture difficult.

## SHARP-BEAKED GURNARD.

*Pterygotrigla polyommata*, Rich.

## Sharp-Beaked Gurnard (Continued).

D. 8/12; A. 12; V. 1/5; P. 12 x 3; C. 13.

Head with upper surface and sides long. Scales exceedingly small. Space between the eyes very concave. Dorsal spines stout. General colour, above crimson pink, below silvery. Pectorals large, greenish, with several black spots edged with white. Iris silvery. Length, 400-500 mm.

References—Castelnau, P.Z.S., Vic., I., p. 88. Waite, Fishes of S.A., p. 204.

The Sharp-beaked Gurnard is also known as the Latchet, and is occasionally called the Flying Gurnard in Tasmania, but this designation correctly belongs to another species. The Sharp-beaked Gurnard is caught on the East Coast, and also in the River Derwent. It appears during the winter months.

## FAMILY PLATYCEPHALIDÆ (Flatheads).

The Flatheads are well-known as certain species are very common around our shores, but, strange to say, very little attention has been given them by local naturalists, and there are doubtless several species occurring in Tasmanian waters that have not yet been recorded from this State. The following may be mentioned:

## SPINY FLATHEAD.

*Hoplichthys haswelli*, McCulloch.

D. 5/14; A. 16; V. 1/5; P. 4/14.

Above yellowish, mottled darker, under white. Length, 432 mm. (17 inches).

Reference—McCulloch, Rec. Aust. Mus., 1907, and "Endeavour" Scientific Results, 1914, p. 132.

A deep water species known to occur on the East Coast.

## DUSKY FLATHEAD.

*Platycephalus fuscus*, Cuv. & Val.

D. 2/7/1/13; A. 13; V. 15; P. 19; C. 13.

Above brown, spotted, under white. Length variable, up to 1220 mm. (4 feet).

References—Castelnau, P.Z.S., Vic., I., p. 86. Waite, Fishes of S.A., p. 198.

A species growing on occasions to very large size.

## COMMON SAND FLATHEAD.

*Platycephalus bassensis*, Cuv. & Val.

D. 1/6-7/14; A. 14; V. 1/5; P. 17; C. 13.

Upper sandy, under white, the upper surface with darker spots. Length variable, up to 500 mm. (19½ inches).

References—(*P. tasmanius*) Gunther, B.M. Cat., II., 179. Waite, Fishes of S.A., p. 199.

The common Flathead of our estuaries.



## SMOOTH FLATHEAD (Rock Flathead).

*Platycephalus lævigatus*, Cuv. & Val.

D. 9/14; A. 14; V. 1/5; P. 19; C. 13.

Upper brown, under white. Sides and fins spotted. Length, up to 500 mm.

References—Castelnau, P.Z.S., Vie., I., p. 84. Waite, Fishes of S.A., p. 199

## ORDER XENOPTERI (Cling Fishes).

The Cling Fishes are small fishes, which cling to stones by means of an adhesive disc.

*Diplocrepis cardinalis*, Ramsay.*Aspasmogaster tasmaniensis*, Gunther.

Reference—Gunther, B.M. Cat., III., p. 507.

## ORDER PEDICULATI (Angler Fishes, &amp;c.).

## FROG FISH.

*Pseudobatrachus dubius*, Shaw.

Reference—McCulloch, Rec. W.A. Museum, 1914, p. 222, fig. 1.

## MARBLED ANGLER.

*Hystrio hystrio*, Linn.

Reference—McCulloch, Fishes of N.S.W., p. 96.

## PRICKLY ANGLER.

*Trichophrynus mitchellii*, Morton.

References—Morton, P. & P. Roy Soc., Tas., 1896, p. 98. Waite, Fishes of S.A., p. 211.

## HAND FISH.

*Brachionichthys hirsutus*, Lacep.

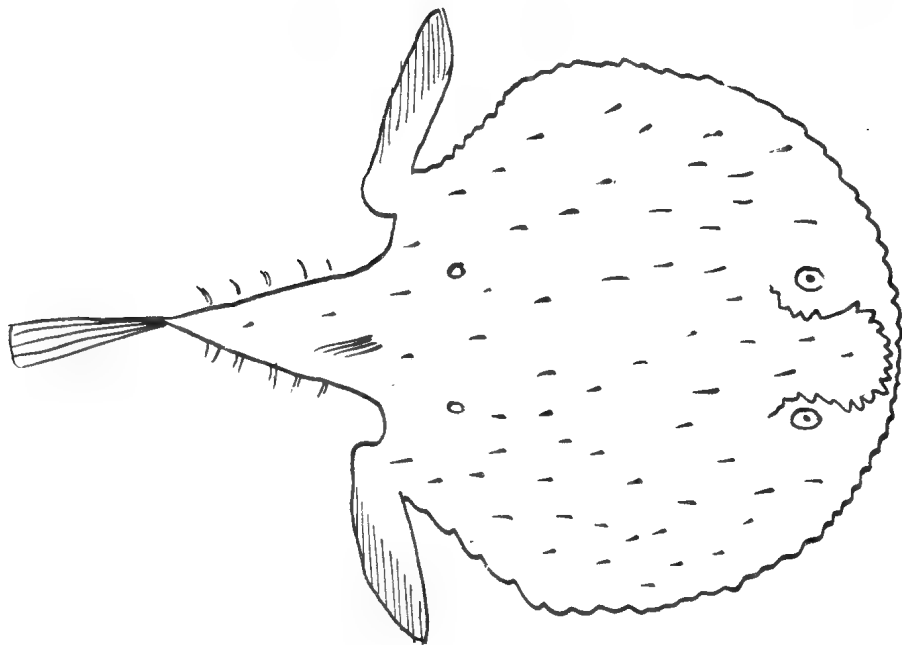
Reference—McCulloch, Fishes of N.S.W., p. 97.

Occasionally taken in the River Derwent.

## RED HAND FISH.

*Brachionichthys politus*, Rich.

## SPINY FROG FISH

*Halieutæa brevicauda*. Ogilby.

D. 4; A. 4-5; P. 14; V. 5; C. 9.

Length, 100-150 mm.

Reference—McCulloch, "Endeavour" Scientific Results, 1914, p. 163, pl. 33, and Records Aust. Mus., 1921, XIII., p. 141.

Specimens of this species have been secured off the Bay of Fires, on the East Coast, from a depth of 45 fathoms.

ORDER *PLECTOGNATHI* (Leather Jackets, &c.).

Fishes of this order are without ventral fin.

FAMILY *MONACANTHIDÆ* (Leather Jackets).

Members of this family have an erectile spine on the head, and the body is covered with minute scales.

A number of species of Leather Jackets occur in Tasmania, but it is impossible to deal fully with each form within the limit of our space. The variations are well worthy of study, as further research is needed in order to understand the life history, colour variations, etc., of the various members of this family. In a general way Leather Jackets may be readily recognised by their tough skins, the contraction of the first dorsal into a strong spine, and their strong teeth. The following may be mentioned:—

## VARIABLE LEATHER JACKET.

*Cantherines hippocrepis*, Quoy. & Gaim.

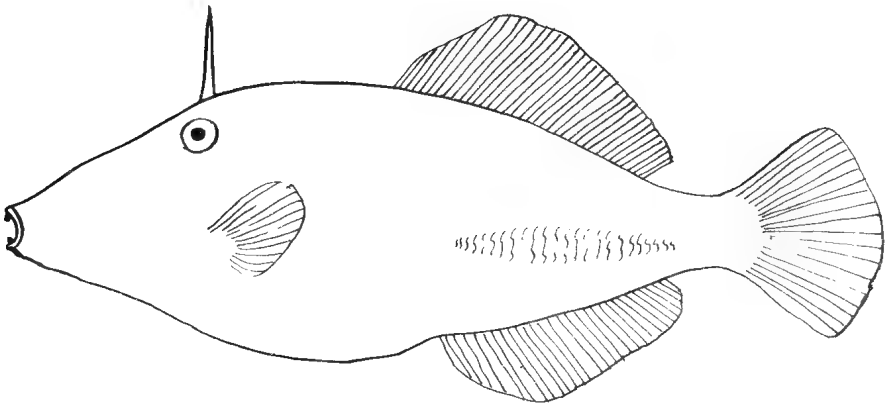
D. 36-39; A. 34-37; P. 13; C. 12.

Colour variable, usually greenish brown, with blue bands, and often with orange spot on side. Length, 450 mm.

References—Gunther, B.M. Cat., VIII., p. 246. Waite, Fishes of S.A., p. 214.

### TOOTH-BRUSH LEATHER JACKET.

*Cantherines guntheri*, Macleay.



D. 33-35; A. 32-33; P. 13; C. 14.

Brown, with dark brown spots and bluish streaks and spots. Adult males with tooth-brush-like spines on tail between dorsal and anal fin. Length, 250-300 mm.

Reference—Waite, Fishes of S.A., p. 215.

### GOLDEN-EYED LEATHER JACKET.

*Cantherines spilomelanurus*, Q. & G.

D. 30-32; A. 28-32.

General colour brownish, with lighter markings, often with a blue line from the chin, through eye, and along middle of side, and a black bar on tail. Length, 200-225 mm.

Reference—Waite, Fishes of S.A., p. 216.

### SMALL BROWN LEATHER JACKET.

*Cantherines maculosus*, Rich.

D. 29-33; A. 29-30.

Colour brownish. Length, 120 mm. (McCulloch considers that this species may be immature form of *C. spilomelanurus*).

Reference—Gunther, B.M. Cat., VIII., p. 25.

## MOSAIC LEATHER JACKET.

*Cantherines mosaicus*, Rams. & Og.

D. 35-36; A. 32-34; P. 13; C. 12.

Length, 200-400 mm.

Reference—Ramsay &amp; Ogilby, P.L.S., N.S.W. (1886), I., p. 5.

## BLACK LEATHER JACKET.

*Cantherines melas*, Gunther.

D. 34; A. 34.

Brownish black, with two whitish bands across chin.

Reference—Gunther, A.M.N.H. (1876), p. V. 17, p. 402.

## DARK BROWN LEATHER JACKET.

*Cantherines gunni*, Gunther.

D. 34; A. 33.

Velvety dark brown, mottled black. Length, 275 mm.

Reference—Gunther, B.M. Cat., VIII., p. 247.

## GREY LEATHER JACKET.

*Cantherines converirostris*, Gunther.

D. 34-37; A. 32-35.

Body spiny, with upper profile of snout convex. Colour grey. Length 225 mm.

Reference—Gunther, B.M. Cat., VIII., p. 248.

## WHITE BANDED LEATHER JACKET.

*Cantherines rudis*, Rich.

D. 34-35; A. 34.

Body covered with rough minute scales. Brown, often with four indistinct white longitudinal bands.

## PALE BROWN LEATHER JACKET.

*Cantherines peronii*, Holland.

Pale brown, irregularly spotted or barred with dark brown. Scales spine-like, D. 32-35; A. 31-33; P. 12; C. 12.

with swollen tips.

References—Gunther, B.M., Cat., VIII., p. 249. McCoy, Prod. Zoo. Vic., pf. 143.

## PIGMY LEATHER JACKET.

*Brachaluteres trossulus*, Rich.

D. 24-28; A. 22-26.

Dark green, with darker and lighter spots and lines.

Reference—Richardson, Voy. Err. &amp; Terr., p. 68, pl. 40 (5-6).

A small species about three inches (177 mm.) long, which frequents shallow water.

## FAMILY OSTRACIIDÆ (Trunk Fishes, &amp;c.).

The members of this family lack the anterior dorsal spine, and the body is enclosed in a carapace of hexagonal plates.

## STRIPED COW FISH.

*Aracana aurita*, Shaw.

D. 10-11; A. 10-11; P. 11-12; C. 11-12.

Back without crest. Spines, one above hind part of orbit, pointing backwards, two on each side of back, one in middle of side, two or three on each side of abdomen. Colour yellowish, with blue lines.

References—Gunther, B.M. Cat., VIII., p. 266. Waite, Fishes of South Australia, p. 223.

## SPOTTED COW FISH.

*Aracana ornata*, Gray.

D. 10-11; A. 10; P. 10-11; C. 11.

Back without crest, a hump in front of eye. Spines, one above middle of orbit, nearly erect, two on back, one in middle or side, and two on abdomen. Colour, blue or yellow, with darker spots on body and lines on snout, abdomen, and tail. Length, 125 mm.

References—Gunther, B.M. Cat., VIII., p. 267. Waite, Fishes of S. Australia, p. 222.

## COW FISH.

*Aracana spilogastra*, Gray.

D. 10/11; A. 10/11; P. 11; C. 11.

Supra-orbital spine directed backwards. Colour yellow, with blue lines, those on the tail forming distinct internmarginal band. Length, 200 mm.

Reference—Waite, Fishes of S. Australia, p. 224.

## YELLOW-BELLIED COW FISH.

*Aracana flavigastra*.

D. 9-11; A. 10-11; P. 11; C. 11.

Supra-orbital spine nearly erect. Colour yellow, with numerous blue lines on body. Length, 140 mm.

Reference—Waite, Fishes of South Australia, p. 224.

## FAMILY TETRAODONTIDÆ (Toad Fish, &amp;c.).

Toad Fish have the power of inflating their bodies. Each jaw is divided, and so there are four cutting teeth. These fishes are poisonous, and should not be eaten.

In Ross' "Hobart Town Almanack" for 1832 there appears an illustration of "The Poisonous Toad Fish," together with an article by Colonial Surgeon James Scott, in the course of which he states: "The melancholy and dreadful effect produced by eating it was lately instanced in the neighbourhood of Hobart Town, on the lady of one of the most respectable merchants and two children, who died in the course of three hours, without being able to give any notice of their danger. The poison is of a powerful sedative nature, producing stupor, loss of speech, deglutition vision, and the power of the voluntary muscles, and ultimately an entire deprivation of nervous power and death. At the inquest over the above bodies the effect of the poison was satisfactorily proved by giving part of the fish left by the unfortunate individuals to two cats, which soon became affected. When both were in a dying state, one had 25 drops of the arsenical solution introduced with a silver tube into the stomach, and rapidly recovered, while the other, which was allowed to take its chance, quickly died." Further particulars of the case are given in "The Colonial Times" of 29th March and 5th April, 1831.

## SMOOTH TOADO.

*Spheroides liosomus*, Regan.

D. 10-11; A. 9.

Dorsal and anal fins short. Skin smooth. Upper brownish, marbled and dotted with blackish brown, often a transverse band between orbits, and large spot at base of dorsal fin. Under greyish white. Length, 100-150 mm.

Reference—Regan, A.M.N.H., Ser., 8, Vol. 4 (1909), p. 439.

The Tasmanian and South Australian form was usually referred to as *S. hamiltoni*, but Regan has shown that the species is distinct.

## TOADO.

*Spheroides richiei*, Frem.

Body covered with minute spines. Snout rather obtuse. Brownish green above, with irregular dark spots. Lower parts uniform white.

Reference—Günther, B.M. Cat., VIII., p. 285.

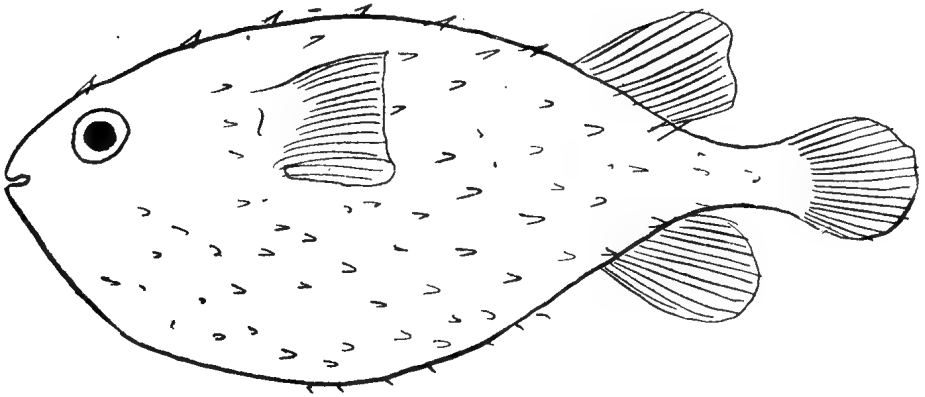
(In regard to this species see Waite, Fishes of S. Australia, p. 226.)

## FAMILY DIODONTIDÆ (Porcupin Fish).

The Porcupine Fishes also have the power of inflating their bodies, which are covered with long spines. The teeth consist of a single cutting edge in each jaw. Non-edible.

## PORCUPINE FISH (Javelin Fish).

*Allomycterus jaculiferus*, Cuvier.



D. 16; A. 15; P. 19; C. 9.

Colour, dark grey above, whitish below. Sides and back with dark spots. Body sparsely covered with spines, which are flattened in sections, and have three overlapping roots. Length, up to 300 mm.

Reference—Gunther, B.M. Cat., VIII., p. 313.

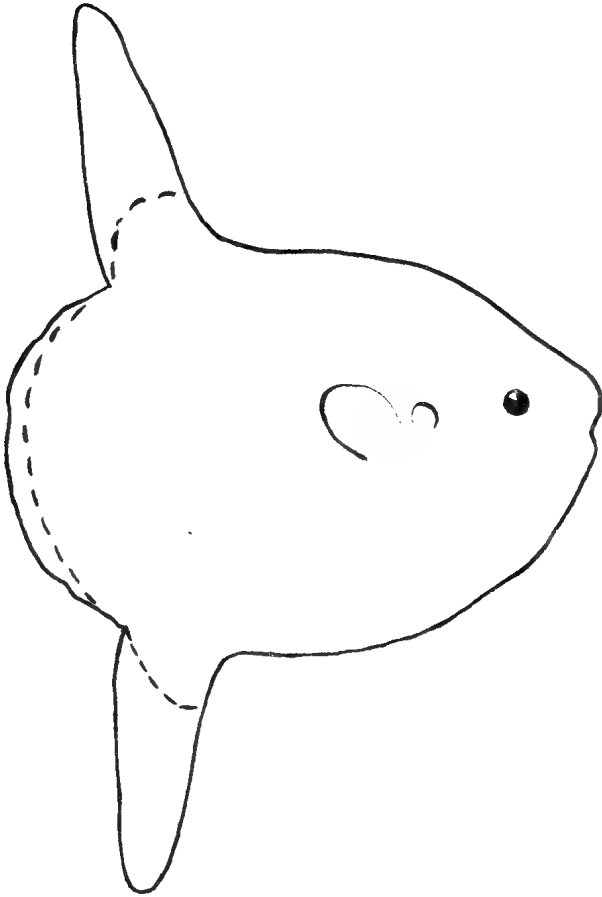
## SLENDER-SPINED PORCUPINE FISH (Globe Fish).

*Atopomycterus nuchthemerus*, Cuv.

Colour, dark greyish blue above, whitish below. Darker markings on sides. Body covered with long spines, which are round in section, and have two roots. Length, up to 300 mm.

Reference—Gunther, B.M. Cat., VIII., p. 315.

## SUN FISH.

*Mola mola*, Linn.

Body compressed, and sub-circular in outline. Colour. above dark greyish brown, under whitish.

Reference—Gunther. B.M. Cat., VIII., p. 317.

The Sun Fish is a most peculiar looking rover of the oceans, growing on occasions to a very large size. It is occasionally caught off the Tasmanian coast,, and specimens have been secured in the Derwent Estuary.





J. W. Benth. Photo.

Forest Country of the South-West of Tasmania.



I. W. Doan's Photo.

Waterfall in the Tasmanian National Park.

## ORDER AMPHIBIA.

## FROGS, &amp;c.

The *Amphibia* may be shortly described as follows:—Cold-blooded animals, which in their early life breathe by means of gills and when adult by means of lungs. The young are hatched from spawn. The skull is jointed to the backbone by means of two condyles.

Tasmanian *Amphibia* have not received in times past anything like the amount of attention they deserve. Perhaps the subject has not been sufficiently kept in the foreground by those who have been called upon to formulate schemes for systematic Nature Study, or it may be that, in itself, the subject has failed to chain the popular fancy. No Naturalist, that we are aware of, has brought so much enthusiasm to bear upon the study of Tasmanian frogs as Mr. T. M. S. English, who for several years studied these creatures in their native haunts, and with pen and brush depicted their habits, and external appearances.

In the course of his wanderings among the bush lands of our island Mr. English constantly met with seven species of frogs belonging to four genera, and although some others are accredited to our fauna, and may exist here, we shall deal chiefly with those most truly allotted to us. Most of our frogs are small creatures not exceeding in total length of body a measurement of 45 mm., which is the standard size of *Limnodynastes tasmaniensis*.

## OSTEOLOGY.

The skeletons of frogs and toads are curiously interesting, since they retain many primitive characters, and really link the fishes with the land animals. The gigantic Salamanders of early Geological ages, together with the living representatives of that group are all recalled when we come to study frogs and toads. Upwards in the scale of being we get reptiles, birds, and mammals, all showing relics of a common lowly origin.

The vertebræ of frogs and toads are reduced to less than ten, generally eight, and all behind that are fused into a solid rod, that passes backwards between the pelvic bones, forming a sort of early attempt at the syn-sacrum of the bird. The two bones of the lower arm are ankylosed together, so that the fore limb seems to consist of two instead of three bones—but as if to make up for this—the astragalus and calcaneum, of the hind limb, are drawn out so as to constitute a third segment to the leg. The skull is both cartilaginous and bony, and articulates to the spine by two condyles, as in the Mammalia, and not by a single knob, as in the true reptiles and birds. The scapular girdle is primitive, and its variations are used throughout the order in classification.

## Class AMPHIBIA (Amphibians).

Cold-blooded animals, which in the early stages of their life breathe by means of lungs. Young hatched from spawn. Skull jointed to backbone by two condyles.

Family CYSTIGNATHINÆ (Burrowing Frogs).

Upper jaw toothed.

Genus *LIMNODYNASTES*.

Toes free, or nearly so. Tympanum barely distinct. Pupil vertical.

*Limnodynastes peronii*.—Peron's Frog.

*Limnodynastes tasmanensis*.—Yellow Striped Frog.

*Limnodynastes dorsalis*.—Burrowing Frog.

Genus *CRINIA*.

Size small. Toes free, or nearly so. Pupil horizontal.

*Crinia signifera*.—Brown Froglet.

*Crinia laevis*.—Smooth Froglet.

*Crinia tasmanensis*.—Tasmanian Froglet.

## Family BUFONIDÆ (Toads).

Upper jaw without teeth.

Genus *PSEUDOPHRYNE*.

Toes free. Tympanum absent. Pupil horizontal.

*Pseudophryne bibroni* (*semi-marmorata*).—Bibron's Toadlet.

## Family HYLIDÆ (Tree Frogs).

Genus *HYLA*.

With vomerine teeth.

*Hyla peronii*.—Tree Frog.

*Hyla ewingi*.—Brown Tree Frog.

*Hyla aurca*.—Green and Golden Bell Frog.

## PERON'S FROG.

*Limodynastes peronii*. Dum. & Bibr.

*Cystignathus peronii*. Dum. & Bibr.

Range—Tasmania (?) and Eastern Australia.

Skin smooth or with very indistinct folds on the back; a granular fold from below the eye to the shoulder. Brownish or olive above, with black spots confluent into longitudinal stripes on the back; frequently a light vertebral line, a dark stripe from the tip of the snout along the canthus rostralis, through the eye to the shoulder; beneath more or less spotted with brown. (B.M. Cat.)

Dimensions—Length (from snout to head), 55 mm.

Reference—Boulenger, B.M. Cat., Batr. Sal. (1882), p. 259.

Gunther wrote in the appendix of his B.M. Catalogue of 1858 (p. 134):—"I am now convinced that this species of Dumeril and Bibron, which I have placed as a doubtful synonym of *L. dorsalis*, forms a distinct species, distinguished from *L. tasmaniensis* by its colouration and the folds on the back."

This is one of the three species accredited to Tasmania on seemingly imperfect evidence, or at least no modern record of their appearance in this island is available, although such workers as Mr. J. J. Fletcher, Mr. English, and others have tried to re-discover them. The British Museum specimens date back to 1858, and

at that early stage of Tasmanian History the imperfect means of transit may account for a slip now and again. Upon the other hand, it is quite possible that the future may yield up specimens, to vindicate the appearance upon our faunal lists of this little creature now held in dispute.

## YELLOW STRIPED FROG.

*Limnodynastes tasmanensis*, Gunther.

*Limnodynastes tasmanensis*, Gunther, Brit. Mus. Cat., Batrachia Salientia (1858), p. 33.

Range—Tasmania and Eastern Australia.

General colour yellowish brown, to grey, spotted with darker spots. More or less distinct orange coloured stripe on back. Under surface whitish purple.

Dimensions—Average length, 45 mm.

References—Boulenger, B.M. Cat., Batr. Sal. (1882), p. 260. McCoy, Prod. Zoo. Vic., Vol. I., pl. 43.

This is a very interesting frog, that of course, varies enormously in colouration, but in a general way may be described as light brown to yellow, having large spots that vary from dark brown to green, with a big stripe along the back that is usually orange tinted. Mr. English, who examined specimens from Ulverstone to Hobart, notes that the general body colour of this creature is at times pink.

A specimen that he studied in February, 1902, in the locality of Westbury, showed that the dorsal stripe manifesting characters that carried it higher up the spectrum than the orange, and distinctly giving colour tones of red.

It is said that this frog makes heavy weather of swimming, and that it usually avoids the water, although selecting moist places under logs and stones for a home.

## BURROWING FROG.

*Limnodynastes dorsalis* (Gray), Gunther.

*Limnodynastes dorsalis*, Gunther, B.M. Cat., Batr. Sal. (1858), p. 33.

Range—Tasmania and Australia.

Colouration variable. General colour above brownish green, irregularly marked or spotted. Dorsal stripe not as pronounced as *L. tasmanensis*. Under surface whitish or lightly spotted with brown or blue, a swollen oval gland on the calf of each leg.

Dimensions—Average length, 75 mm.

Reference—Boulenger, B.M. Cat., Batr. Sal. (1882), p. 261.

This frog is best known by its loud booming notes, sufficiently penetrating to carry a fourth of a mile away, while a company of them make the air vibrate with their vocal performance.

It carries a less pronounced dorsal stripe than the former species; tends more to brown than green, and has very irregular spots upon the body, in place of the circular oval or elongated spheres of its congener.

Mr. English was fortunate enough to make serial observations upon the development of this species, and his notes record the following items.

Early specimens, found in September, as against the more usual October, or even November, were noted of a total length of three inches for the tadpole, and at the stage in which the hind legs first appear. Seen again on November the 10th the hind legs were well advanced, and by December the true frog stage had been reached.

Observations respecting this Tasmanian frog are badly needed, and our bush friends could do useful work here.

## BROWN FROGLET.

*Crinia signifera*, Girard.*Crinia signifera*, Girard, Proc. Ac. Philad (1853), p. 422 (B.)

Range—Tasmania and Southern Australia.

Size small. General colour brown to grey. Under surfaces paler, and spotted or marked with darker markings.

Reference—Boulenger, B.M. Cat., Batr. Sal. (1882), p. 265.

This is a small frog, dark brown to grey in colour, with darker tints for the male, who indeed may be quite black, and is said to be normally so, under the throat, during the breeding season. Mr. English twice recorded males having their thighs and hinder parts blood red in colour, and that from localities as widely separated, as Hobart and Zeehan.

The frogs of this species have notes that, to well attuned ears, simulates that of the mole crickets, and are also of similar sound values to those produced by the true toads. Apparently the eggs are laid from May to August, under shallow water, being spread over stones, and even the weeds that line the bottoms of ponds and rivulets.

All the individual specimens reported upon are said to be equally active upon land and in the water—they also make no attempt at avoiding water, as in the case of *Limnodystes*.

During some years this frog can be seen in considerable numbers quite close to the main path in the Cataract Gorge, sitting under the ferns enjoying the moist air that arises beneath their fronds. One morning seventeen were in sight in a distance of a dozen yards.

## SMOOTH FROGLET.

*Crinia lavis*, Gunther.*Pterophrynus lavis*, Gunther, P.Z.S., 186, 4, p. 48.

Range—Tasmania.

Above grey, with marked sides, under surfaces lighter.

Dimensions—Length (of body), 27 mm.

Reference—Boulenger, B.M. Cat., Batr. Sal. (1882), p. 266.

The frogs of this species may be said to be light grey above, marbled on the sides, and lighter underneath. Some variation is usual at the breeding season, and yellow throats and blotched backs (manifesting brown spots) are noted in this connection. Mr. English makes an exceedingly interesting note respecting the breeding habits of these little creatures, his observations being that, instead of laying the eggs in the water, the parent frog makes, or re-adapts, hollows in the ground, and in these deposits the eggs. As a matter of fact these are better called "underground chambers" than mere depressions, that would be exposed to dangers from above, and the latter term is used by this careful naturalist to whom we owe so many of our nature notes upon the amphibians under review. From one of these nests Mr. English collected, on March 30, 1902, two frogs and a mass of eggs, and of the latter he records:—

1. Eggs separated in a week's time.
2. Tadpoles born May 4, and thence forward began their several developments.

## TASMANIAN FROGLET.

*Crinia tasmaniensis*, Gunther.*Pterophrynus tasmaniensis*, Gunther, P.Z.S., 1864, p. 48.

Range—Tasmania.

Upper parts dark brown, with more or less distinct broad reddish olive band running from behind eye towards the loin. Lower parts beautifully rose coloured.

Dimensions—Length (of body) 27 mm.

References—Gunther, P.Z.S., 1864, p. 48. Boulenger, B.M. Cat., Batr. & Sal. (1882), p. 266.

This species was described by Gunther in 1864 from specimens presumably obtained in Tasmania. As far as we are aware the only known specimens are the types in the British Museum. We have been unable to trace other specimens in Tasmania, and the validity of this species appears to be open to question. So much, however, remains to be done in investigating the Tasmanian *Amphibia* that no definite pronouncement can be made.

## BIBRON'S TOADLET.

*Pseudophryne bibronii*, Gunther.*Pseudophryne bibronii*, Gunther, B.M. Cat., Batr. & Sal. (1858), p. 46.

Range—Tasmania and Eastern Australia.

Above dark brown to black. Under surface marbled white grey and black, or in some specimens greenish grey, with faint marbled markings.

Dimensions—Length of body, 27 mm.

Reference—Boulenger, B.M. Cat., Batr. & Sal. (1882), p. 260.

The Tasmanian form of this species is usually referred to as *Pseudophryne semi-marmorata*.

As far as is known this is the only member of the true toad family (*Bufo*nidae) that Tasmania can lay claim to, although seeing how little systematic study has been devoted to this section of our fauna, it is too early to say that others exist. A few more workers of the type of Mr. English who would spend a season or two now and again in investigating reptilian life, and we might have quite another tale to tell. Owing to its small size, this creature is commonly called a "toadlet," and it is apparently widely distributed across the island. The colour is dark brown to black above, marbled below with the three tints, white, grey and black. From the rounded posterior end of the body a dart of colour shoots upwards to about the middle of the back; this is generally yellow. Mr. English, who has carefully noted the colour plays while the toadlet is in motion, records the parts of the body revealed by the act of locomotion as being tinted brilliant orange yellow.

Eggs laid under stones, and not adherent into a common mass. Tadpoles were hatched by April 21., when the eggs collected were placed in water.

## TREE FROG.

*Hyla peronii*, Bibron.

Range—Tasmania (?) and Australia.

Brown or olive above, more or less distinctly dotted or marbled with darker, groin and sides of thighs, sometimes also *axillæ*, black and yellow marbled, sometimes a rather indistinct light vertebral line, beneath whitish, the throat frequently variegated with brown. (B.M. Cat.)

Dimensions—Length, 57 mm.

Reference—Boulenger, B.M. Cat., Batr. Sal. (1882), p. 390.

There is a single specimen in the British Museum, presented by Sir A. Smith prior to 1858, which was stated to have been collected in Tasmania. We have no further records of the species occurring in Tasmania, and until further specimens are secured the position is one of doubt.

### BROWN TREE FROG.

*Hyla ewingi*, Dum. & Bibr.

Range—Tasmania and Australia.

Yellowish grey above. A wide dorsal stripe of brownish grey, a darker patch leading backwards from the eye. Under surface whitish, immaculate.

Dimensions—Length, 42 mm.

Reference—Boulenger, B.M. Cat., Batr. Sal. (1882), p. 406.

Tasmania and the southern portion of Australia. The frogs of this species are mainly aquatic, and live chiefly in wet places, or if upon dry ground not far from a water hole. They are fine swimmers, and dive to perfection. They breed in winter, and their eggs have been recorded in July, with tadpoles hatching out at the end of the month. This is Mr. English's note, and he adds:—"During November the pools they frequent in a normal season are fast drying up, and the water which remains is packed with tadpoles. Early in December the pools mostly dry up, and unless the tadpoles become frogs they perish."

Some years ago the waters of Lake Tiberias were unusually high, and upon their return to normal limits enormous numbers of these frogs were stranded in pools (in the frog stage), and dead bodies of those whose pools had evaporated too quickly to enable the change from tadpole to adult stage were strewn all over the shore. Anybody wishing to pay special attention to the final phases of the tadpole stage would have a good opportunity for such a study. The most common colour of this frog is yellowish grey, with a wide dorsal stripe of darker tint (may even be green), with a dark patch leading backwards from the eye.

### GREEN AND GOLDEN BELL FROG.

*Hyla aurea*, Lesson.

*Rana aurea*, Lesson, Voy. Coquille, Zoo., II., p. 60, pl. 7, f. 2.

Range—Tasmania and Australia.

Colour variable, in accordance with surroundings. General colour bright green above, and bluish on under surface. The upper surface banded yellow.

Dimensions—Length, 80 mm.

References—Boulenger, B.M. Cat., Batr. & Sal. (1882), p. 410. McCoy, Prod. Zoo., Vic., Vol. I., pl. 53.

This is our largest frog, and is generally called the green and gold frog, although white and blue enter into its total colour display. A fine specimen was seen to hop out of the ferns in the Cataract Gorge, and alight upon a lichen covered rock, and with wonderful rapidity the blaze of colour faded out, and it assumed tints so similar to its surroundings that quite a stream of visitors passed along without even once seeing it.

Another specimen that came to hand, a perfect marvel of colour beauty, was placed under a small table fountain, and while other members of the family were being called to see its lovely dress it changed to so neutral a tint that it seemed hardly worth coming to see, and much good natured banter was expended upon the convener in consequence! It is to all intents and purposes analogue of the common European frog that serves as a table relish, and its habits are similar. Mr. English notes that the tadpoles are fish-like in colour, greenish olive above, and silvery below. They attain the frog stage in February.



Class *REPTILIA* (Reptiles).

Cold-blooded vertebrates, breathing air by means of lungs. Skin usually covered with scales. Oviparous or viviparous. Skull joined to backbone by one condyle.

Order *ATHECÆ* (Chelonia).

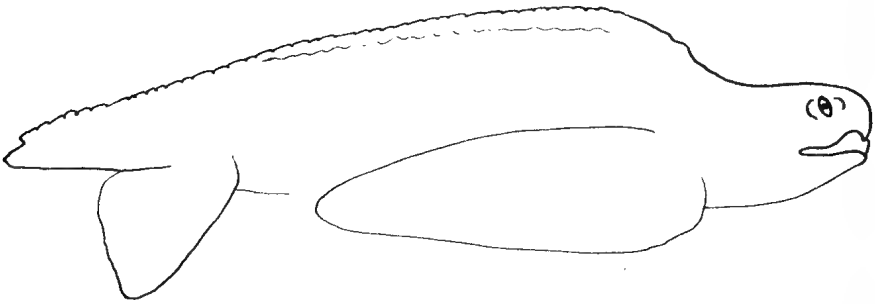
## TURTLES.

Turtles are of such a unique form that there is no need for detailed description in the present instance. This order is only "accidentally" represented in Tasmania by solitary specimens occasionally wandering well to the south of their usual range. Turtles generally are by no means common when considered in relation to the existing world fauna at the present day. Rather they represent a type which occurred as far back as Triassic times, and reached their greatest development at the end of the Mesozoic period.

The only species of which there is a record of occurring in Tasmania is the Leathery Turtle.

## THE LUTH, or LEATHERY TURTLE.

*Sphargis coriacea*, Linn.



This species has a wide distribution through the inter-tropical seas, and very rarely ranging as far South as Tasmania.

Form turtle-like, the body being covered with very thick leathery skin. Seven longitudinal ridges on back. Paddles large, without claws. Head with strong jaws, the upper with three triangular notches in front. Orbits large and vertical.

References—McCoy, *Prod. Zoo., Vic.*, II., pl. 101. Cambridge, *Natural History*, Vol. VIII., p. 334.

The Luth, or Leathery Turtle, is but a rare visitor to Tasmanian coasts. One specimen in the Tasmanian Museum, which measures slightly over seven feet in

total length, was secured at Fortescue Bay, on the South-East Coast, in March, 1889. Kershaw records (Victorian Naturalist, Vol. XXVIII. (1911), p. 94, that in 1901 a large specimen of the Leathery Turtle entered Corio Bay, at Geelong. It was accompanied by a number of Pilot Fish (*Nucrates ductor*).

### Order OPHIDIA (Snakes).

Two classes of Snakes are met with in Tasmania. The ordinary venomous land snakes and the rare, as far as our island is concerned, sea snakes. The number of species is very limited, for of the former class there are only three representatives, and of the latter but two.

We have no true tree snakes, pythons, harmless snakes, or death adders in Tasmania. The three terrestrial species are all poisonous, and constitute the sole danger of the bush. The species of lizards, which are often referred to by bushmen as "death adders" and "blood suckers" are, in reality, quite harmless.

The scales covering the bodies of snakes are formed by folds of the skin, and are not like the separate scales of a fish. In each species the scales are differently arranged, and it is mainly on such distinctions that the various species are determined. In the following pages an abbreviated key to each species is given by showing—(i.) the number of scales (S.) round the body; (ii.) the number of ventral plates (V.), which are the large single abdominal plates; (iii.) the anal plate (A.), which in all the Tasmanian species is entire, but in certain of the mainland species is paired; and (iv.) the number of sub-caudal plates (S.C.), which are the ventral plates of the tail—that is the ventral plates posterior to the anal plate. In all the Tasmanian species recorded to date sub-caudals are single, but in many allied genera they are paired. Attention is also drawn to the central scale on the head—technically the frontal plate or shield—as this is of importance as regards specific distinction, and it also affords an easy method of identifying the three Tasmanian species. In referring to three species as being the Tasmanian quota we would also note that a fourth species has been described from Tasmania (*Denisonia nigra*, De Vis., Annals of the Queensland Museum, No. 6, p. 50), but we are of opinion that this is merely one of the variable forms of *Denisonia coronoides*.

Such forms as *Denisonia flagellum*, *Furina bimaculata*, and *Furina caloonoti* have been recorded in the past as occurring in Tasmania, but our investigations as regards these three species show that the original record of locality was evidently a mistaken one. There is not an iota of evidence in favour of retaining any of these on a Tasmanian list.

It is of interest to note that Ronald Gunn, writing in 1852, made the following reference to the snakes of Tasmania:—"The number of species is still undetermined, but there are believed to be at least ten, although the young of some kinds may be mistaken for distinct species."

Another point that it is particularly necessary to emphasise in regard to the Tasmanian Snakes is the great variation in colouration. In determining species colour must be totally disregarded. For instance, the typical Tiger Snake has a body colour of golden brown, crossed by about fifty bands of dark brown. We have seen such specimens at low altitudes, and also in the Valley of the Broad River (National Park), three thousand five hundred feet above sea level. We have also seen them jet black, and also we particularly remember one that caused us some temporary excitement on Bruny Island. This was a magnificent specimen, over five feet long, and the general body colour was yellowish white! But he was a true "Tiger"—especially as regards his fighting qualities. The Whip Snake also shows extreme variation as regards colouration.

The scales of the Sea Snakes (*Hydrophinae*), which occasionally visit the Tasmanian coast, are arranged in a different manner to the land snakes. This particularly applies to the Spotted-tailed Sea Snake, which has become well adapted for an aquatic existence. In this case the ventral scales have given place to a keel shaped body, covered with scales, which are placed edge to edge, and do not overlap.

The means of progression used by a snake are often discussed when snakes form the topic of conversation, as they often do, for in bush camps such reptiles are

given their due regard. The details of a snake's method of locomotion are in keeping with the elastic movement of its whole body. Locomotion is effected by the combined gripping action of the ventral plates and the interior action of the ribs. First on one side, and then on the other, a section of the ribs are drawn more closely together, the ventral plates meanwhile taking advantage of any roughness in the ground. This alternate expansion and contraction of the ribs along different sections and on alternate sides of the body, accounts for the sinuous method of progression usually adopted, and which can be put to such good effect in suitable surroundings; whereas if a snake is placed on a polished surface, such as glass, it is practically useless.

It is well to remember that all Tasmanian species are venomous. At certain seasons, such as while shedding their skins, the poison may not have much effect unless the person bitten be in bad health. There is also the fact to be noted that many people suffer severely from shock when bitten by a snake, and it has been stated that as many people die from shock as from the poison. In any circumstances, however, the bite of such a species as the Tiger Snake cannot be treated lightly, and immediate attention should be given.

The method of striking and injecting the poison is an interesting point. Fortunately, the Tasmanian snakes have not large gapes, and are only able to bite effectively within certain limits. The poison gland is situated in the upper jaw, near the eye, and the poison is wrung out of this gland by a beautifully balanced muscular movement, along the connecting vein, and forced over the fang as soon as the snake strikes. It is important to remember that the poison fang is fortunately not hollow in the Tasmanian species, and if a person is bitten through any thick covering the poison will be wiped off before the fang penetrates the flesh.

Another point to remember is that if any of the fangs are broken or extracted they are quickly replaced by others in a few days' time. A snake cannot be made a harmless reptile, at any rate for long, by merely drawing his fangs.

Owing to the number of snakes that are to be met with in Tasmania it might not be out of place to briefly refer here to the treatment for snake bite.

If the poison has been properly injected the effect varies. In some cases it appears to act immediately, in others it is delayed. The usual symptoms are signs of weakness and drowsiness. The main thing to guard against is fear—fright will do more harm than the venom in most cases. It is as an antidote to this that a little alcohol should be given the patient from time to time, in order to keep up his or her spirits, and to assist the heart's action, more than as a preventative against the actual effects of the poison.

Medical aid should be obtained as soon as possible, but in many cases this material assistance cannot readily be obtained. In any case, a cord or twisted handkerchief should be tied above the wound, and twisted tightly with the aid of a stick. The wound should be cut round, and caused to bleed freely, and if possible sucked for some time, but the person rendering such aid should have no cuts or sores in their mouth, for then there is danger of the poison affecting them. After half an hour the ligature can be removed for a short time, and then replaced.

After the flesh surrounding the wound has been cut it should be treated with Permanganate of Potash (Condy's Crystals).

A very handy pocket case containing a lance and a small packet of crystals can be purchased at most chemists, and such an item is well worthy of being incorporated in the outfits of parties camping in the bush.

#### ORDER *OPHEDIA* (Snakes).

Reptiles with elongated and limbless bodies, covered with scaly skin. Gape capable of great extension. Carnivorous.

Family *COLUBRINÆ* (Colubrine Snakes).

Section *PROTEROGLYPHA* (Grooved-fanged Snakes).

Venomous snakes, having grooves in fangs of the upper jaw.

DIVISION *ELAPINÆ* (Land Snakes).Genus *DENISONIA*.

Viviparous. Head more or less distinct from body. Scales directed obliquely.  
Tail moderate.

*Denisonia superba*.—Superb Snake.

*Denisonia coronoides*. White-lipped Whip Snake.

Genus *NOTECHIS*.

Head distinct from neck. Body cylindrical. Tail short.

*Notechis scutatus*.—Tiger Snake.

DIVISION *HYDROPHINÆ* (Sea Snakes).Genus *HYDRUS*.

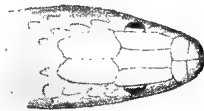
Nostrils on top of snout. No ventral shields.

*Hydrus platurus*.—Spotted-tailed Sea Snake.

Genus *PLATURUS*.

Nostrils on side of snout. Ventral shields large.

*Platurus laticaudatus*.—Wandering Sea Snake.



## WHITE-LIPPED WHIP SNAKE.

*Denisonia coronoides*, Gunther.

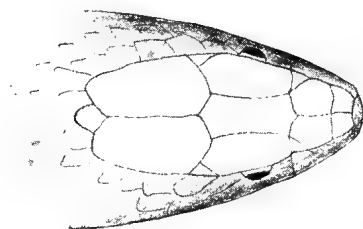
*Hoplocephalus coronoides*, Gunther, B.M. Cat. (1858), p. 215.

This species occurs in Tasmania, Victoria, New South Wales, South and West Australia.

Body scales in 15 rows. Ventral plates 130-150. Anal plate single. Subcaudals (entire) 35-60. Central scale on head approximately three times as long as broad. Colour extremely variable from black to white, and from red to green. Average length about 20 inches (510 mm.).

References—Boulenger, B.M. Cat. Snakes (1896), VIII., p. 336. Waite, Australian Snakes, p. 55 (1898). Lord, Tasmanian Snakes, p. 14 (1919).

The White-lipped Whip Snake is one of those few Tasmanian species which have appropriate vernacular designations as the white markings on the lip are its most distinctive feature. This species is well distributed over the island. We have seen it on the sea-shore, and on the tops of mountains over 4500 feet in altitude. Its variety of habitat is only excelled by its variety of colouration. As a general rule the body is brown, but it appears to adapt itself to environment as regards colour protection, for we have seen specimens in grassy paddocks which were almost sage green in colour. Again, in the late summer, in localities where the grass has died off and withered almost white, we have killed specimens of this species which were practically the colour of the withered grass. Colour is, therefore, no key to identification, and the main point to be noted in this regard concerning this species are (i.) the white markings on the lip, and (ii.) the central shield on the head, which is about three times as long as broad.



SUPERB SNAKE.

*Denisonia superba*, Gunther.

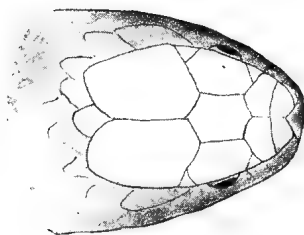
*Hoplocephalus superba*, Gunther, B.M. Cat. (1858), p. 217.

This species occurs in Tasmania, Victoria, New South Wales, and South Australia.

Body scales 15-17 rows. Ventral plates 150-170. Anal plate single. Subcaudals (entire) 40-50. Central shield on head approximately twice as long as broad. Colour variable—usually black to reddish brown. Average length from 3 to 5 feet (915-1525 mm.).

References—Boulenger, B.M. Cat. Snakes (1896), VIII., p. 335. Waite, Australian Snakes, p. 54 (1898). Lord, Tasmanian Snakes, p. 13 (1919).

This species is also known as the Copper-headed Snake, the Large-scaled Snake, and the Diamond Snake. The last designation is totally inappropriate, as the true Diamond Snake (*P. variegatus*) is a python, and a variety of the true Carpet Snake, which does not occur in Tasmania.



## TIGER SNAKE.

*Notechis scutatus*, Peters.*Naja scutata*, Peters, Mon. Berl. Ac. (1861), p. 690.

This species occurs in Tasmania and Australia in general.

Body scales in 15-18 rows. Ventral plates 150 or more. Anal plate single. Sub-caudals (entire) 40-60. General scale on head, shield shaped, almost as broad as long. Colour variable. In the typically marked specimens the body colour is golden brown, crossed by almost fifty bands of dark brown. Average length from 3 to 5 feet (915-1525 mm.). One specimen in the Tasmanian Museum measures as much as 6 feet 2½ inches (1895 mm.).

References—Boulenger, B.M. Cat. Snakes (1896), VIII., p. 351, Waite, Australian Snakes, p. 60 (1898). Lord, Tasmanian Snakes, p. 16 (1919).

The Tiger Snake is probably the most evenly distributed, as well as the most deadly of our snakes, and care must always be taken when dealing with a "Tiger," especially in the early summer, which is the breeding season. This species, as with others, shows very considerable variation as regards colouration, and the various vernacular designations which have been given to the colour varieties has tended to considerably confuse matters. For instance, bush dwellers usually refer to the dark coloured specimens as "Black" Snakes, and the lighter forms as "Carpet" Snakes. Both terms are incorrect. Neither the true Black Snake (*Pseudechis porphyriacus*)—which has paired sub-caudals—nor the true Carpet Snake (*Python variegatus*) occur in Tasmania. The latter is a non-poisonous python growing up to 14 feet, and is met with on the mainland.

All the Tasmanian snakes are viviparous—that is, the young are brought forth in a fully developed state. One specimen of a Tiger Snake dissected at the Tasmanian Museum was found to contain no less than 109 young.

## WANDERING SEA SNAKE.

*Platurus laticaudatus*, Linn.*Columer laticaudatus*, Linn (1754).

This species is met with in the Indian and Pacific Oceans.

Scales in 19 rows. Ventrals 211-245. Sub-caudals 25-45. Body colour olive above, and yellowish beneath, with from 30 to 50 encircling black rings. Length approximately 3 feet (915 mm.).

References—Boulenger, B.M. Cat. Snakes (1896), VIII., p. 307. Waite, Australian Snakes, p. 68 (1898).

This species is but a rare visitor to our coasts. There is a specimen in the British Museum which was obtained from Tasmania. It is not such a truly aquatic species as the Spotted-tailed Sea Snake, as the ventral scales are present, and the scales overlap.



Blue-tongued Lizard

N. S. R. Shadlow (Photo)



Dr Hodgkinson Photo

Dragon Lizard.



## SPOTTED-TAILED SEA SNAKE.

*Hydrus platurus*, Linn.*Anguis platura*, Linn (1766).

This species is met with in the Pacific and Indian Oceans.

Scales in 45-47 rows. Ventral plates nil. Scales laid edge to edge. Colour black above, yellow below. Tail yellow, spotted black. Average length less than 3 feet (915 mm.).

References—Boulenger, B.M. Cat. Snakes, VIII., p. 267. Waite, Australian Snakes, p. 71 (1898). Lord, Papers and Proceedings of the Royal Society of Tasmania (1919).

This snake was first recorded from Tasmania in 1919. It is probably but a rare visitor or straggler to our coast. This species is particularly adapted for an aquatic existence as, in addition to the especially developed swimming tail, the ventral plates have merged into the body scales, and the under side of the body has become keel shaped.

## ORDER LACERTILIA (Lizards).

The members of this Order are terrestrial reptiles, which differ from snakes in that the jaws are not expandable, the eyelids are almost invariably movable, and there are external openings to the ear.

Lizards usually have both fore and hind limbs, but either or both of these may be atrophied, as, for instance, in the Slowworm (*Pygopus*). Externally the head, and usually the body, is covered with scales. As regards internal structure, a urinary bladder is developed (absent in the *Ophidia*). The copulatory organ, as with snakes, is double. Most species are oviparous.

A characteristic, which is often noticed in relation to Lizards, is the ease with which they shed portion of the tail if they are held by that member, and the manner in which a fresh tail grown in place of the lost portion.

Few creatures have been more unkindly treated, owing to mistaken notions concerning their natural economy, than the Lizards. It is often thought that certain of our Tasmanian lizards are poisonous, and they suffer accordingly. As a matter of fact there are only two lizards in the world which are capable of injecting poison into the system, and these are confined to America. A lizard bites its prey to kill it, and it often succeeds in its object, but it does not poison it. The names "death adder," "blood sucker," etc., which are applied indiscriminately to many of our Tasmanian lizards, are quite misnomers. Certain of our larger species are capable of giving a sharp bite if roughly handled, but beyond this they are perfectly harmless.

## ORDER LACERTILIA (Lizards).

Family GECKONIDÆ (Geckoes).

Genus *HOPLODÆTYLUS*.

*Hoplodactylus pacificus*.

Family PYGOPIDÆ (Slow Worms).

Lizards with thin elongated bodies. Fore limbs absent. Hind limbs rudimentary. Tail very long and brittle.

Genus *PYGOPUS*.

Dorsal scales keeled.

*Pygopus lepidopus*.—Slow Worm.

Family AGAMIDÆ (Dragon Lizards).

Genus *AMPHIBOLURUS*.

Mouth large. Teeth erect in both jaws. Body depressed. Tympanum distinct.

*Amphibolurus adelaidensis*.—Queen Adelaide's Dragon.

*Amphibolurus diemensis (augulifer)*.—Mountain Dragon.

*Amphibolurus muricatus*.—Common Dragon.

Family SCINCIDÆ (Skink Lizards).

Genus *EGERNIA*.

*Egernia whitii*.—Smooth Egernia.

Genus *TRACHYSAURUS* (Introduced).

Tail short and stumpy. General size large. Scales very rough.

*Trachysaurus rugosus*.—Stump-tailed Lizard.

Genus *TILIQUA*.

Blue tongued Lizards. General size large. Scales smooth.

*Tiliqua scincoides*.—Blue-tongued Lizard ("Goanna").

*Tiliqua nigrolutea*.—Southern Blue-tongued Lizard ("Goanna").

Genus *LYGOSOMA*.

*Lygosoma lesuerii*.

*Lygosoma entrecasteaux*.

*Lygosoma trilineatum*.

*Lygosoma metallicum*.

*Lygosoma pretosium*.

*Lygosoma ocellatum*.

*Lygosoma casuarinæ*.

*Lygosoma punctatovittatum*.

## PACIFIC GECKOE.

*Hoplodactylus pacificus*, Gray.

*Nautilinus pacificus*, Gray, Catalogue (1845), p. 169.

This species occurs in New Zealand, and there is one specimen from Tasmania (?) in the British Museum.

(After Boulenger.) Head uniform. Body and limbs rather slender. Head covered with granular scales. Rostral broad. Dorsal scales minutely granular. Tail cylindrical, tapering. Colour, brown above, with irregular transverse darker bands on the back and tail, and frequently a dark band on each side, commencing from the tip to the snout, and passing through the eye and above the ear. A short dark oblique streak directed posteriorly from the inner border of the eye; lower surfaces whitish immaculate.

The following are the measurements of a B.M. specimen:—

Total length	..	..	163	mm.
Head	..	..	20	„
Width of head	..	..	15	„
Body	..	..	57	„
Fore limb	..	..	28	„
Hind limb	..	..	37	„
Tail	..	..	86	„

Reference—Boulenger, British Museum Catalogue (1885), Vol. II., p. 173.

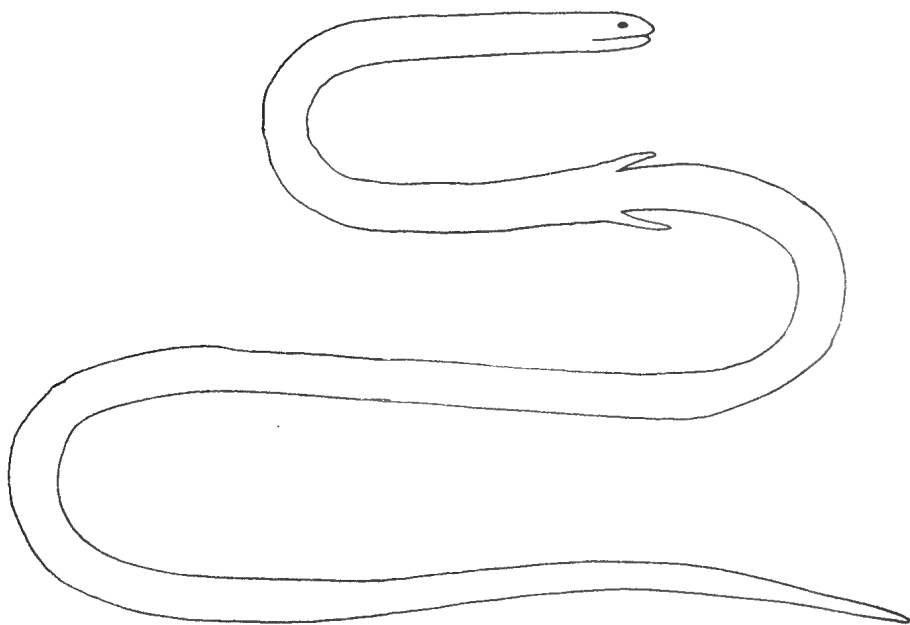
There is one specimen of this species in the British Museum. All the rest are from New Zealand, and there are none from Australia. It is doubtful if this specimen is correctly labelled as regards locality, as no other record of its occurrence in the island appears to be available, and we have never met with any specimens during the course of our investigations.

We give the above descriptions in case the species should occur in the island, and should any specimens be obtained the collectors may place their discovery on record.

### THE SLOW WORM.

*Pygopus lepidopus*, Lacep.

*Bibes lepidopodus*, Lacep, An. Mus., IV., 1804, p. 193.



## The Slow Worm (Continued).

This species occurs in Australia, and there is one specimen so far recorded from Tasmania.

Body snake-like in character. Head not distinct from neck. Snout rounded in front. Tail tapering, about twice as long as body. The tail is detached very easily, and specimens are often seen with tails which have re-grown. In these cases the tail is only the length of the body usually. Posterior legs, represented by scaly stumps at posterior of body. Scales round body usually 22, of which 12 are keeled. The colour is very variable, from uniform grey to brown, or spotted longitudinally, with three or five rows of quadrangular blackish spots, fringed white. Average length (of perfect specimen), 500 mm.

Reference—McCoy, *Prod. Zoo., Vic.*, pl. 152.

The occurrence of this species in Tasmania is one of apparent doubt. There is one specimen in the British Museum, and upon Mr. G. A. Boulenger being appealed to he wrote (25/4/18) as follows:—"As to the *Pygopus*, it formed part of a collection made by Mr. Gunn, and I have no reason to doubt the authenticity of its origin."

We have not been able to secure a specimen in Tasmania, and there do not appear to be any records in the local museums relating to this species.

There is one point, however, that seems worthy of mention. There is a bush belief (almost as firmly rooted as the mistaken idea that young kangaroo are born in the pouch) to the effect that if you burn a snake alive its legs will appear! May not this idea have arisen owing to an innocent Slow Worm being mistaken for a snake, and being burnt out of its retreat. An examination of its body would reveal the stumpy hind legs, and so give rise to the above-mentioned belief.

The Slow Worm is, of course, perfectly harmless. It can be easily recognised by the stumpy hind legs, the keeled scales, and its exposed ear. In perfect specimens the tail is about three times as long as the body (from head to hind legs). Owing to the very brittle nature of the tail, however, and the ease with which the animal parts with all or portion of its posterior element, perfect specimens are not always secured. In the event of the original tail being lost another is soon grown, but it does not reach the size of the original member.

## QUEEN ADELAIDE'S DRAGON.

*Amphibolurus adelaidensis*, Gray.

*Grammatophora muricata* var *adelaidensis*, Gray, *Grey's Travels in Australia*, Volume II., Appendix, p. 439 (1841).

This species occurs in Tasmania, Victoria, South and West Australia.

Build stout. Gular scales keeled. Body much depressed, covered with irregular strongly keeled scales. Ventral scales keeled. Limbs short. Tail round, depressed at base. Colour pale olive, grey above. Lower parts white, marbled darker.

Average total length, 125 mm. Average length of tail, 75 mm.

Reference—Boulenger, *Catalogue Lizards*, British Museum (1885), Volume II., p. 387.

The Agamides are a family of lizards which range over most of the world except America. Queen Adelaide's Dragon is a spring lizard, which is often referred to as a "bloodsucker," but they are quite harmless. The colouration is slightly variable, especially as regards sex characteristics. In the male the under parts of the body are white, with black marblings, while the female is usually marbled grey on a light ground.

*Amphibolurus adelaidensis* var *tasmaniensis*, Baul.

Distinguished from the typical species by the two shaped black streaks on the throat. The male also has an elongated spot of black on the chest, and two or three longitudinal black lines on the under surface. The markings on the female are duller.

Reference—Boulenger, Catalogue Lizards, British Museum (1885), Volume I., p. 388.

## MOUNTAIN DRAGON.

*Amphibolurus diemensis* (*angulifera*), Gray.

*Gerrhonotus maricatus* var *diemensis*, Gray, Gray's Travels in Australia, Volume II., p. 439 (1841).

This species occurs in Tasmania, Victoria, New South Wales, and West Australia.

Body stout. Head short. No dorsal crest. Upper head scales rough and strongly keeled. Sides of neck studded with small spines. Gular scales keeled. Body much depressed, and covered with irregular scales. Ventral scales pointed and keeled. Limbs and digits short. Tail round, depressed at base, with five longitudinal series of spinose scales. Colour, above brown, sides darker, a dark brown black edged band along back. Lower surfaces paler, usually dotted or lined with darker markings.

Average total length, 200 mm. Average length of tail, 123 mm.

Reference—Boulenger, Catalogue Lizards, British Museum (1885), Volume I., p. 389.

This species is often met with under rocks, etc., especially on the hills, hence the name of Mountain Dragon. It reaches over  $7\frac{1}{2}$  inches in length.

## COMMON DRAGON.

*Amphibolurus muricatus*, Shaw.

*Lacerta muricata*, Shaw, White's Journal Voyage, N.S.W., 1790, App., p. 244.

This species occurs in Tasmania and Australia.

Body stout and depressed. Scales largest on middle of back, unequal and keeled. A small vertebral crest or ridge, with row of larger spines on each side. Gular and ventral scales slightly keeled. Tail round. Colour, upper surfaces brown, under surfaces paler. Sometimes a light band on each side of back, and a series of angular dark spots along middle of back. Tongue and mouth bright yellow.

Average total length, 310 mm. Average length of tail, 205 mm.

Reference—Boulenger, Catalogue Lizards, British Museum (1885), Volume I., p. 390.

The largest of the Tasmanian Spiny Lizards, and, according to the popular tradition, a "bloodsucker" of most horrible character. In reality a harmless lizard, whose sole means of attack is a sharp bite. This species grows to over a foot in length.

## SMOOTH ROCK LIZARD.

*Egernia whitii*, Lacep.*Scincus whitii*, Lacep, Ann. Mus., Paris, IV., 1804, p. 192.

This species occurs in Tasmania and Australia.

Scales very smooth. Lateral scales smoother than dorsals. Colour, upper surfaces olive brown. Two dorsal black bands, with a series of white or yellowish spots. Under surfaces pale olive. Edge of eyelids and ear lobules constantly white.

Average total length, 300 mm. Tail, 187 mm.

Reference—Boulenger, Catalogue Lizards, British Museum (1887), Volume III., p. 135.

The Smooth Rock Lizard is a common species in many localities, such as on rocky hillsides and on mountain tops amid the diabase boulders.

## STUMP-TAILED LIZARD.

*Trachysaurus rugosus*, Gray.*Trachydrosaurus rugosus*, Grey, B.M. Cat. (1845), p. 102.

Type specimen in British Museum. This species occurs in Australia, and has been introduced into Tasmania in recent years.

Head distinct from neck. Head shields convex rugose. Dorsal scales very large and rough. Ventral scales smaller. 20-30 scales round body. Tail very stumpy, approximately the same length as head. Colour, brown above, with yellowish spots or cross bands. Under surfaces yellowish, spotted or marbled brown.

Average total length, 355 mm. Average length of tail, 64 mm.

Reference—Boulenger, British Museum Catalogue (1887), III., p. 143.

The Stump-tailed Lizard was introduced into Tasmania from Australia some years ago. It is occasionally to be met with in some districts at the Northern portion of the island.

## SOUTHERN BLUE-TONGUED LIZARD.

*Tiliqua nigrolutea*, Gray.*Tiliqua nigroluteus*, Grey, A.K., IX., Syn. (1831), p. 68.*Tiliqua nigroluteus*, Gray, A.K.S., 1831, p. 68.

This species is found in Tasmania and Southern Australia.

Anterior temporals not larger than others. Scales smooth. Dorsals largest and rugose. Forelimbs as long or longer than the head. Tail cylindrical, and not quite half the length of head and body. Colour, brownish or olive above, with richer and more defined markings than *Tiliqua scincoides*. The spots or bands a dark rich brown. Under surfaces paler.

Average total length, 375 mm. Average length of tail, 120 mm.

References—Boulenger, British Museum Catalogue (1887), Volume III., p. 146. McCoy, Prod. Zoo., Vic. (1887), p. 119.

This is the smaller species of the Blue-tongued Lizards which occur in Tasmania. Like the larger species, it is often referred to as a "Goanna" or "Sleepy Lizard." They are, of course, quite distinct from the large "Goannas" or "Iguanas" of the mainland.

## BLUE-TONGUED LIZARD.

*Tiliqua scincoides*, Shaw.*Lacerta scincoides*, Shaw, White's Journal, N.S.W., 1790, p. 242.

Type specimen in British Museum. This species is found in Tasmania and Australia.

Anterior temporal scales larger than others. Scales smooth, laterals smaller than dorsals or ventrals, 30-40 round middle of body. Tail cylindrical, and shorter than body. Colour, yellowish brown above, with dark brown cross bands, and often a dark brown band along sides of neck and over temple. Lower surfaces uniform yellowish or spotted brown.

Average total length, 590 mm. Average length of tail, 250 mm.

Reference—Boulenger, British Museum Catalogue (1887), Volume III., p. 145.

This species is the largest of the genus, which embraces five species that range across Australia, and to the islands to the North. Two of these species occur in Tasmania. It is sometimes referred to as a "Goanna," a totally inappropriate designation, and also as the "Sleepy" or "Jew Lizard." A distinguishing feature of this and the closely allied species is the blue tongue.

## GIANT LYGOSOMA.

*Lygosoma lesuerii*, Dum. & Bibr.*Lygosoma lesuerii*, Dum. & Bibr., V., p. 733.

This species is found in Tasmania and Australia

General form slender. Tail over twice the length of head and body. 24-35 smooth scales round body. Hind limb reaches wrist or elbow of adpressed fore limb. Colour, brownish olive above, marked with wide vertebral black band, tipped with white, also a white, black edged streak on either side of back. Under surfaces white.

Average total length, 275 mm. Average length of tail, 190 mm

Reference—Boulenger, British Museum Catalogue (1887), III., p. 225.

This species is one of the large Tasmanian Lygosomas, reaching nearly 11 inches (280 mm) in length.

*Lygosoma entrecasteauxii*, Dum. & Bib.*Lygosoma entrecasteaux*, Dum. & Bibr., E.G., 1839, p. 717.

This species is found in Tasmania, Victoria, and New South Wales.

Front parietals distinct. Snout short and obtuse. Lower eyelid with very large transparent disc. Eye nearly distinct when lid closed. 28-32 scales round middle of body. Dorsals largest, usually striated. Adpressed limbs usually meet or overlap. Colour, olive brown above, with three black longitudinal bands, laterals broadest and edged above and below by light streak. Under surfaces greenish grey.

Average total length, 125 mm. Average length of tail, 75 mm.

Reference—Boulenger, British Museum Catalogue (1887), Volume III., p. 276.

This small but handsome species shows very pretty markings when examined with a lens. The under surfaces are greenish grey, and the scales of the throat are particularly liable to take on a bronzy green shade.

*Lygosoma trilineatum*, Gray.*Tiliqua trilineata*, Gray, Ann. Mag. Nat. Hist., II. (1838), p. 291.

Type specimen in British Museum. This species is found in Tasmania, Victoria, New South Wales, South Australia, and Western Australia.

Front parietals not distinct. Snout short and obtuse. Lower eyelid with undivided transparent disc. 26-28 scales round centre of body. Dorsals largest slightly striated. Adpressed limbs fail to meet. Colour, bronze olive above, with black, light edged, lateral band. Frequently the light lateral streaks are also edged with black, and a ventral streak present. Lower surfaces greenish grey or almost white.

Average total length, 175 mm. Average length of tail, 110 mm.

Reference—Boulenger, British Museum Catalogue (1887), Volume III., p. 279.

In this species the length of the tail appears to vary in different individual specimens, but the average length will be found to be approximately as above. The bronzy olive colouration of the body is usually decorated with a lateral band. Sometimes a vertebral streak is present, and the lateral bands also vary as regards the amount of black and white markings present.

*Lygosoma metallicum*, O'Shaughn.*Mocia metallicum*, O'Shaughn, Ann. Mag. Nat. Hist., XIII. (1874), p. 299.

Type specimen in British Museum. This species occurs in Tasmania, Victoria, South Australia, New South Wales, and certain of the islands to the North of Australia.

Snout short and obtuse. 24-28 scales round middle of body. Dorsals largest. Adpressed limbs meet or overlap. Tail usually one and a half times the length of body. Colour, bronze olive above, with small dark brown spots, sometimes with a dark brown vertical streak. Sides dark brown, light dotted, often a more or less distinct light streak from ear to groin. Lower surfaces uniform grey or dotted.

Average total length, 135 mm. Average length of tail, 80 mm.

Reference—Boulenger, British Museum Catalogue (1887), Volume III., p. 280.

This Lizard has a tail one and a half times the length of the body. It is bronze olive in colouration, and the total length usually about five and a quarter inches. It has a wide range for, as well as being found in Tasmania, it occurs in Australia and in the islands to the North.

*Lygosoma pretiosum*, O'Shaughn.*Mocia pretiosa*, O'Shaughn, Ann. Mag. Nat. Hist., XIV. (1874), p. 298.

True specimen in British Museum. This species occurs in Tasmania.

Snout short and obtuse. Lower eyelid with undivided transparent disc. Front parietal single. 34-38 scales round middle of body. Dorsals largest. Adpressed limbs meet or overlap. Tail a little longer than head and body. Colour, olive above, with small dark and light spots. Black lateral band. Sometimes a black vertical streak. Lower surfaces greenish. Lips and throat black dotted.

Average total length, 120 mm. Average length of tail, 65 mm.

Reference—Boulenger, British Museum Catalogue (1887), Volume III., p. 282.

A small species about four and a half inches long, which can frequently be seen sunning itself on rocks, etc. It is extremely active, and glides away into a protective crevice with great agility. If the scales of its back are examined under a lens it will be seen that each one is marked with two or three grooves, thus reproducing a feeble copy of the markings on the dorsal scutes of the Alligators.



*Lygosoma ocellatum*, Gray.*Mocoo ocellata*, Gray, Cat., 1845, p. 82.

Type specimen in British Museum. This species occurs in Tasmania.

Snout short and obtuse. Lower eyelid with individed transparent disc. Fronts-parietal single. 50-54 scales round middle of body. Dorsals largest. Tail a little longer than head and body. Colour, pale olive above, with black markings, sides darker, usually with more or less distinct pale olive colouration. Greyish or grey on under surface, with darker lines between series of scales.

Average total length, 145 mm. Average length of tail, 80 mm.

Reference—Boulenger, British Museum Catalogue (1887), Volume III., p. 283.

This species is usually a little over five and a half inches long, the tail being more than half the length of the body. The body colour is olive, darker at the sides, and merging into greenish grey on the under surface.

*Lygosoma casuarinæ*, Dum. & Bibr.*Cyclodus casuarinæ*, Dum. & Bib., E.G. (1839), p. 749.

This species occurs in Tasmania, Victoria, and New South Wales.

Snout moderate, obtuse, lower eyelid scaly. Fronts-parietals extinct. 22-24 smooth scales round middle of body, laterals smallest. Tail a little longer than head and body. Colour, upper pale olive to blackish, uniform, or with some or all of the scales edged with black. Lower surfaces pale olive, usually spotted or marbled with black.

Average total length, 310 mm. Average length of tail, 170 mm.

Reference—Boulenger, British Museum Catalogue (1887), Volume III., p. 322.

This rather pretty species is usually about twelve to thirteen inches long when mature. In the immature state there are a number of brownish red blotches about the body.

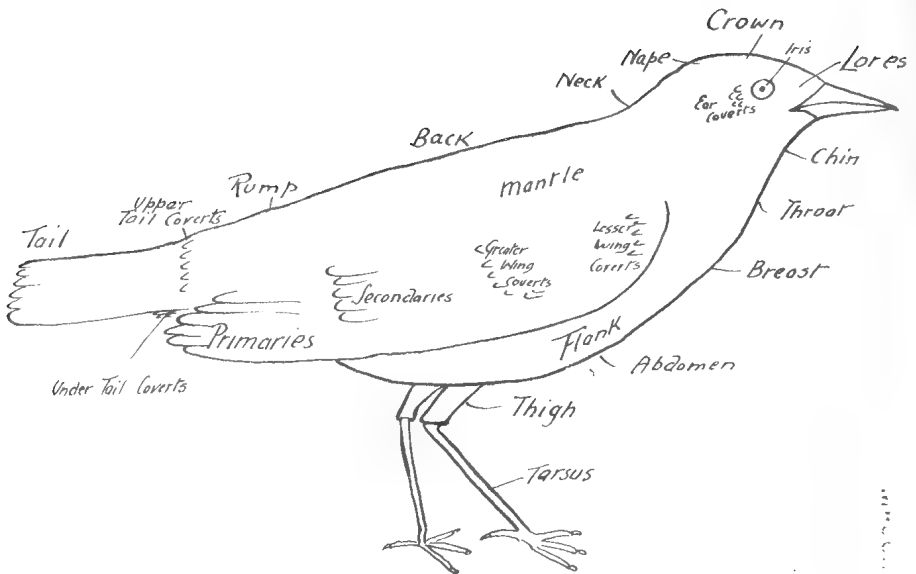
*Lygosoma punctatovittatum*, Gunth.*Rhodona punctatovittata*, Gunth., Ann. Mag. Nat. Hist., XX. (1867), p. 47.

This species occurs in Tasmania and Eastern Australia.

Body elongate and cylindrical. Limbs rudimentary, hind part larger. 18-20 scales round centre of body. Colour, pale brown above, each scale with black dot, the shield of the head edged. Under surface yellowish white.

Average total length, 180 mm. Length of tail, 90 mm.

References—Boulenger, British Museum Catalogue (1887), Volume III., p. 335. McCoy, Prod. Zoo. Vic., Vol. I., pl. 51.



## THE BIRDS OF TASMANIA

The general topography of Tasmania must be taken in account when dealing with its avifauna, even more so than with certain other sections of the vertebrates. Firstly, one has to decide what constitute the Tasmanian seas in order to work out the records of the occurrences of many of the oceanic species of wide range.

The varied climate and altitude of the island itself has a great effect on the distribution of species; for instance, the very wet climate of the West Coast, producing as it does the dense Beech (*Fagus*) forests, is not conducive to many forms of bird life. The lake district of the Central Plateau serves as a home for many aquatic and semi-aquatic forms, as well as a Mecca for certain of the migratory forms which visit the island.

The Midlands and the Eastern portion of the island are suitable for many species, including certain of the wading birds.

The limits of the present work prevent anything but a bare synopsis of each species. The list, however, will be found as complete as possible within the limits of the present knowledge of our avifauna. The descriptions are mostly adopted from "A Descriptive List of the Birds of Tasmania," by Clive Lord, which was published some years ago. Students requiring detailed information may obtain same by following the references given under each species, and also by consulting F. M. Littler's "Handbook of the Birds of Tasmania." In the present list the scientific nomenclature has been brought up to date, and this should prove of value.

For detailed references refer to the New Check List of Australian Birds which is being brought out by the Royal Australasian Ornithologists' Union.

The economic importance of our avifauna cannot be too greatly stressed. It is impossible to deal with this aspect of the case within the limits of the present work, but we hope that the few remarks that are made in this connection will cause more consideration to be given to our native birds. We feel sure that if those who are dependent upon the products of the land were to fully understand the life history and economy of our birds there would be a far greater measure of protection



Beane Photo

Dense Beech, Sassafras and Pine Forest, typical of the heavy rainfall areas of the West Coast.



Beattie Photo

Open Eucalypt Country of the East Coast of Tasmania

afforded them. More than this, the value of the birds in keeping in check many pests is of national importance, and worthy of the closest attention by that branch of the State's public service which has the control of agriculture and kindred callings. One point we would particularly desire to emphasise, and that is the great menace of the domestic cat, particularly those that go wild and wander into the bush. The domestic cat is undoubtedly a source of national loss.

## EMU.

*Dromaius novæ-hollandiæ*, Latham.

*Casuarius novæ-hollandiæ*, Latham, Index Orn. (1790), II., p. 665.

Range—Tasmania (now extinct) and Australia.

Tasmanian form (extinct), *Dromaius novæ-hollandiæ diemenensis*, Le Souef Bult., Brit. Orn. Club., XXI., p. 13.

General colour ashey-grey. Under, grey. Throat whitish.

Dimensions—(Type of *D.N. diemenensis*).  
Bill, 95 mm. Tarsus, 355 mm.

Nest and Eggs—Nest on ground, very similar to mainland forms.

References—Gould, Birds of Australia, Vol. VI., pl. 1. Mathews, Birds of Australia, Vol. I., pls. 1 and 2.

It is with regret that we are forced to record that the first species which occurs on the list of our avifauna is now extinct. In West's "History of Tasmania," published in 1852, occurs the following (Vol. I., p. 33):—". . . the Emu. Very few individuals can now exist in the island, and it is to be feared that its total extinction will be effected ere it can be ascertained whether the Tasmanian bird is identical with that of New Holland. Tame emus are common in the colony, but the original stock of most of those now domesticated was introduced from Port Phillip." This passage was written within fifty years of the foundation of the colony, and tends to show the immense destruction which went on in the early days. We desire to direct special attention to this, in the hope that it will serve to emphasise the fact that within recent years there has been a tendency for other species to follow in the trail of the Emu. We hope that better laws and a more enlightened public opinion concerning our native fauna will serve to prevent further extinctions.

As is well known, during the early years of the settlement there was an acute shortage of supplies. Parties were sent into the bush to secure food, and Kangaroo and Emu meat was received into the Public Stores (Historical Records of Australia, Series III., Vol. I., p. 361) for the purpose of issue as rations. This led to an era of excessive hunting, and it is doubtful if the Forester Kangaroo or the Emu ever recovered from it. The Emu is now extinct, and the Forester Kangaroo is found only in small numbers in a few localities.

Mathews states (Birds of Australia):—"There are only three skins known. Two in the British Museum, and one in the Frankfurt Museum in Germany."

## KING ISLAND EMU.

*Dromaius minor*, Spencer.*Dromaius minor*, Spencer, Victorian Naturalist, XXIII., p. 139 (1906).

Range—King Island (now extinct)

General colour, brown, tinged blue.

Dimensions—Smaller than *D. nova-hollandia*.

Nest and Eggs—Undescribed.

References—Spencer, Victorian Naturalist, XXIII., p. 139. Mathews, Birds of Australia, Vol. I., pl. 4.

Very little is known concerning this species, but research among the records of the early explorers may bring further details to light. A longer series of osteological specimens from the deposits on King Island may also assist.

## PENGUINS.

The birds of this order are remarkable in many respects. They are only found in the Southern Hemisphere, and their true home appears to be amidst the Subantarctic islands. In appearance they are unique, as the wing has become a flapper, and the plumage is very thick and evenly distributed. Penguins do not have the feather tracts (*pterylæ*) that occur in other birds.

The legs are very short, and are placed far back on the body. This position enables the legs to be used as a rudder when the penguin is diving in search of food or when the flapper-like wings are being used to good effect in order to enable the bird to move rapidly on the surface. The sea is the true habitat of the Penguins, and although flightless, they have been noted many hundreds of miles from land. Furthermore, they are the only birds which are able to swallow their food under the water, which explains why they often remain under the surface for such long periods.

When on shore, where the Penguins come to breed, they are seen at a disadvantage, and their lumbering gait is very amusing to watch, particularly if they happen to be in a hurry.

As regards the occurrence of the order in Tasmania, we have only one resident breeding species, the Little or Fairy Penguin. The larger species are but stragglers from the Subantarctic regions.

The largest species, the King Penguin, belongs to the genus *Aptenodytes*, the outstanding features of which are large size, long flippers, long thin bills, and very strong legs and feet. The crest is absent.

The Crested Penguin constitute the genus *Eudyptes*, the characteristics of which are the more or less yellow crest, the comparatively large size, medium flippers, short and thick bill. The exact representation of this order, as far as Tasmania is concerned, needs a longer record of specimens before the species can be placed with any degree of certainty.

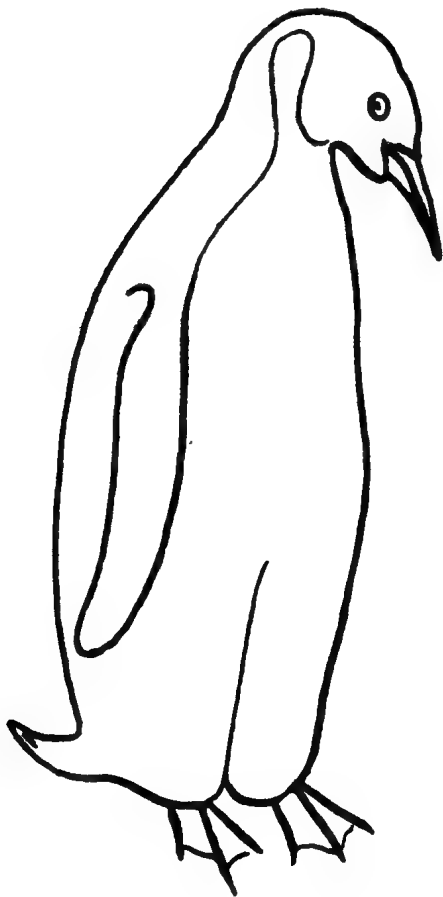
We have included three species of Crested Penguins in the list, but at the same time desire to recall the fact that boats returning from Macquarie Island often brought back live penguins, and we know of instances where these were liberated in the Derwent. Against this there is the fact that Penguins travel immense distances, and that the Crested Penguins visit Tasmania of their own accord is proved by the fact that the first record of a Crested Penguin from Tasmania was made as long ago as 1773, when Forster secured one in Adventure Bay. This was during Furneaux's stay in the bay when he had become separated from Captain

Cook. He named the bay after his ship, the "Adventure," and the small island at the south-eastern end, Penguin Island, "from a curious one caught there." This refers to the first Crested Penguin from Tasmania.

The remaining species belongs to the genus *Eudyptula*, the characteristics of which are small size, small flippers, short and stout bill, and short legs. The sole Tasmanian species of the genus *Eudyptula minor*, the Little or Fairy Penguin, has been a source of considerable discussion, as for a long time two species were usually made, the Little, and the Fairy Penguin. After the researches of Alexander and Nicholls (Emu XVIII., p. 50) it has become the rule to lump the various degrees of colouration, etc., and to recognise but one slightly variable and generally distributed form.

### KING PENGUIN.

*Aptenodytes patagonica*, Miller.



## King Penguin (Continued).

Range—Subantarctic regions.

Tasmanian form—*Aptenodytes patagonica halli*, Mathews, Birds of Australia, I., p. 272.

Above, bluish grey. Head and cheeks black, neck yellow. Under white. Wing a flapper. Feet black.

Dimensions—Length, 950 mm. Bill, 125 mm. Wing, 275 mm.

Nest and Eggs—No nest. Egg (1), white (105 mm. x 75 mm.)<sub>4</sub>

Reference—Mathews and Tredale, Man. Birds of Australia, Vol. I., pl. 1.

Hall has recorded a specimen from Maria Island (Emu IX., p. 250), on the East Coast of Tasmania. It is quite possible that this bird was brought up on one of the vessels from Macquarie Island and liberated, as we know of several such cases. There were boats coming to Hobart from Macquarie Island about this time.

We know of another record, however, as Mr. P. W. Kellaway saw a bird which evidently belonged to this species on the beach at Adventure Bay, Bruny Island, a few years ago.

We would be more sure that such specimens were stragglers of their own accord if we did not know that the crews of vessels returning from Macquarie Island were in the habit of bringing the live birds up to Hobart,

## CRESTED PENGUIN.

*Eudyptes chrysocome*, Forster.

Range—Southern seas.

Upper bluish black, head black, with line of yellow feathers over eye, forming crest at sides of head. Under silver-white. Wing a flapper. Bill reddish brown. Tarsi and feet whitish.

Dimensions—Length, 500 mm. Bill, 45 mm. Wing, 145 mm.

Nest and Eggs—No nest built (except rarely). Eggs (1-2) white (62 mm. x 45 mm., variable). Breeds New Zealand August to December.

References—Gould, Birds of Australia, Vol. VII., pl. 83. Mathews, Birds of Australia, Vol. I., pl. 65. Mathews & Iredale, Man. Birds of Australia, Vol. I., pl. 11. Emu XVI., p. 185.

The Crested Penguin is but an occasional visitor to the coasts of Tasmania. Care is needed to distinguish between this and the following species, as they bear a superficial resemblance. A longer series of records and detailed observations are necessary before the exact position of these species in relation to the Tasmanian Ornis can be definitely stated.

The following species may also be included as occasional visitors:—

## VICTORIA PENGUIN.

*Eudyptes pachyrhynchus*.

## BIG CRESTED PENGUIN.

*Eudyptes sclateri*.



## LITTLE PENGUIN.

*Eudyptula minor*, Forster.

Range—Australian seas.

Upper bright steel blue. Under silvery white. Wing a flapper. Bill black. Tarsi and feet whitish.

Dimensions—(Variable) Length, 400 mm. Bill, 38 mm. Wing, 100 mm.

Nest and Eggs—Nest in burrow. Egg (1-2) white (55 mm. x. 45 mm.), variable. October to December.

References—Gould., Birds of Australia, Vol. VII., pl. 84, 85. Mathews, Birds of Australia, Vol. I., pl. 66, 67. Alexander and Nicholls, Emu XVIII., p. 50.

The Little Penguin is extremely plentiful around the Tasmanian coasts. It frequents the larger rivers, and can be seen in the vicinity of the Hobart wharves. Anybody who has done any yachting on the Derwent is familiar with the "bark" of the Little Penguins, especially when sailing at night.

This species breeds in many places, not only within the Derwent River, but all around the coast. There are large rookeries on Bruny Island, and it is here that many of our observations regarding this species have been carried out. We regret that limitations of space prevent our giving detailed observations concerning their habits, etc.

For many years a diversity of opinion existed in regard to this species, many observers recognising two forms, the Little Penguin (*E. minor*) and the Fairy Penguin (*E. undina*), but it is now generally considered that one species exists. This, however, is liable to considerable variations.

Penguins are often found infected with the Penguin Flea (*Parasyllus australiacus*).

## ORDER GALLIFORMES (Quails, &amp;c.).

The members of this order are all game birds with short and thick bills. In Tasmania the sole representatives of the order are the Quails. These birds were very numerous in the early days of the State's history, and there are constant references to them in the early records. The French explorers found them numerous on the islands in D'Entrecasteaux Channel, and Partridge Island was so named because the French mistook the Quails for Partridges.

## STUBBLE QUAIL.

*Coturnix pectoralis*, Gould.*Coturnix pectoralis*, Gould, Syn. Birds of Australia, pt. II.

Range—Tasmania and Australia.

Tasmanian form—*Coturnix pectoralis pectoralis*, Gould.

General colour brown, lined black and white. Breast lighter. Breast of male black (until April). Throat reddish. Bill bluish. Legs and feet flesh colour.

Dimensions—Length, 190 mm. Bill, 12 mm. Wing, 110 mm. Tail, 33 mm. Tarsus, 25 mm.

Nest and Eggs—Nest on ground. Eggs (7-12) buff, blotched brown (32 mm. x 22 mm.). Nests November to January.

References—Gould, Birds of Australia, Vol. V., pl. 88. Mathews, Birds of Australia, Vol. I., pl. 9.

The Stubble Quail derives its vernacular name because of its preference for the stubble fields, where it obtains a plentiful food supply. Quails are of great economic value to the farmer, because they destroy countless thousands of seeds of noxious weeds.

## BROWN QUAIL.

*Syonicus australis*, Latham.

*Syonicus australis*, Latham, Index Orn. Supp., p. LXII.

Range—Tasmania and Australia.

General colour brown, blotched black and chestnut. Under surface paler. Bill bluish. Legs and feet yellow.

Dimensions—Length, 205 mm. Bill, 15 mm. Wing, 106 mm. Tail, 50 mm. Tarsus, 25 mm.

Nest and Eggs—Nest on ground. Eggs (7-12) dull white, freckled brown (32 mm. x 23 mm.). Nests November to January.

References—Gould, Birds of Australia, Vol. V., pl. 89-91. Mathews, Birds of Australia, Vol. I., pl. 10.

The Brown Quail is evenly distributed but is by no means as plentiful as formerly. This is partly due to the advance of settlement and the fact that the Quail is considered an excellent Game Bird. Another reason for the decrease in numbers is that, being a ground bird, it has suffered severely from the number of cats that are now to be found in the country. There is no greater enemy to our bird life than the domestic cat which has "gone bush."

## SWAMP QUAIL.

*Syonicus psilophorus*.

Range—Tasmania.

Similar to Brown Quail, but larger.

Nest and Eggs—Nest on ground. Eggs (7-12) dull white, freckled brown.

References—Gould, Birds of Australia, Vol. V., pl. 90. Mathews, Birds of Australia, Vol. I., pl. 11.

Cabinet ornithologists, who judge merely from the skins, and pay no regard to the field habits of the species, do not recognise this species as distinct from the Brown Quail. The majority of Tasmanian ornithologists (and also Quail shooters) are in agreement that the Swamp Quail is quite a different bird from the ordinary Brown Quail.

## PAINTED QUAIL.

*Turnix varia*, Latham.*Turnix varia*, Latham, Index. Orni. Supp., p. LXIII.

Range—Tasmania and Australia.

Tasmanian form—*Turnix varia varia*, Latham.

General colour chestnut, speckled and lined. Under grey. No hind toe. Bill brown. Legs and feet reddish brown.

Dimensions—Length, 190 mm. Bill, 15 mm. Tail, 40 mm. Tarsus, 22 mm. Female larger than male.

Nest and Eggs—Nest on ground. Eggs (4) whitish, spotted purple and bluish grey (27 mm. x 22 mm.). Nests August to December.

References—Gould, Birds of Australia, Vol. V., pl. 82. Mathews, Birds of Australia, Vol. I., pl. 15.

The Painted Quail is not common in Tasmania. It frequents slightly different country to the true Quail, as it seems to prefer drier country. Amid such localities as the sandy, heathy flats near Southport Lagoon, small convoys may occasionally be disturbed.

## ORDER COLUMBIFORMES (Pigeons).

The Pigeons constitute an order in which the tarsi are covered with scales. As far as Tasmania is concerned the numerical strength of the species occurring here is not large, as but five are represented, and three of these are practically "accidentals." The Purple-crowned Fruit Pigeon and the Top-knot Pigeon may be classed as such; whilst there is also one record (Emu, Vol. XXXL, p. 75) of the occurrence in the island of the Red-crowned Pigeon.

The remaining species, the Bronzewing and Brush Bronzewing, are fairly evenly distributed in such localities as are suitable for their habitat, but, as with many species, the advance of settlement tends to their decline.

## RED-CROWNED PIGEON.

*Ptilonopus regina*, Swan.

Range—Tasmania (accidental), N.E. Australia, New Guinea, etc.

General colour above dark green, marginal yellow. Tail feathers tipped yellow. Head magenta-red, with yellow margin. Chin whitish. Chest grey, with black margins, merging into green. Abdomen magenta, anteriorly merging into orange, and thence to yellow of vent.

Dimensions—Length, 220 mm. Bill, 20 mm. Wing, 135 mm. Tail, 70 mm. Tarsus, 17 mm.

References—Gould, Birds of Australia, Vol. V., pl. 55. Mathews, Birds of Australia, Vol. I., pl. 22.

The only record of this species in Tasmania that we are aware of is that recorded by Lord and Arnold in 1922 (The Emu, Vol. XXII., p. 175). A specimen was shot at Bothwell, and forwarded to the Tasmanian Museum by Mr. Edgell.

## PURPLE-CROWNED PIGEON.

*Ptilonopus superbus*, Temminck.*Columba superba*, Temm. Les. Pigeons (1811), p. 75.

Range—Tasmania (accidental), N.E. Australia, Papuan and Moluccan Islands.

Top of head purple. Cheeks green. Back of neck red. Upper dark green, splashed black. Throat and chest lavender grey, with black band between greenish white surface of breast and under tail coverts. Bill green, feet red.

Dimensions—Length, 215 mm. Bill, 15 mm. Wing, 130 mm. Tail, 75 mm. Tarsus, 18 mm.

Nest and Eggs—Nest of sticks. Eggs (1) white (30 mm. x 22 mm.).

References—Gould, Birds of Australia, Vol. V., pl. 57. Mathews, Birds of Australia, Vol. I., pl. 24.

The Purple-crowned Pigeon is but a rare and accidental visitor to Tasmania, its true home being in the North-East of Australia and among the Papuan and Moluccan Islands.

## TOP-KNOT PIGEON.

*Lopholaimus antarcticus*, Shaw.*Columba antarctica*, Shaw, Zoo. Nov. Holl. (1793), pl. 5.

Range—Tasmania (accidental), East Australia.

Plumage grey, darker on upper surface. Red ring round eye. Top-knot in front, merging into reddish brown. Tail blackish grey, barred buff. Bill red, tipped grey. Legs and feet red.

Dimensions—Length, 450 mm. Bill, 15 mm. Wing, 275 mm. Tail, 170 mm. Tarsus, 30 mm. Female smaller.

Nest and Eggs—Nest of sticks. Egg (1) white (43 mm. x 31 mm.).

References—Gould, Birds of Australia, Vol. V., pl. 61. Mathews, Birds of Australia, Vol. I., pl. 28.

The Top-knot Pigeon is but an occasional visitor to Tasmania. It is fairly common at certain seasons in the coastal scrubs of Eastern Australia, towards the North. Within recent years four specimens have been forwarded to local museums, most of the specimens coming from the East Coast.

## BRONZEWING PIGEON.

*Phaps chalcoptera*, Latham.*Columba chalcoptera*, Latham, Index Orni. (1790), II., p. 604.

Range—Tasmania and Australia.

Tasmanian form—*Phaps chalcoptera chalcoptera*, Latham.

Upper colour brown. Throat white. Wings bronze. Bill brownish black. Feet red.

Dimensions—Length, 350 mm. Bill, 20 mm. Wing, 200 mm. Tail, 120 mm. Tarsus, 25 mm.

Nest and Eggs—Nest of twigs. Eggs (1-2) white.

References—Gould, Birds of Australia, Vol. V., pl. 64. Mathews, Birds of Australia, Vol. I., pl. 35.

The Bronze-wing Pigeon is gradually becoming more rare, partly on account of the opening up on the country, and also because it is shot both in and out of season in many country districts. Those who know the Tasmanian bush are all familiar with the "whirr"-like flight of the Bronzewing, which is usually met with in the gullies towards the end of the day, as the birds then return to the waterholes to drink. In colouration effects this species will more than hold its own with many of the more highly coloured semi-tropical forms.

### BRUSH BRONZE-WING PIGEON.

*Phaps elegans*. Temminck.

*Columba elegans*, Temm., Les Pigeons (1811), II., p. 56.

Range—Tasmania and Australia.

Tasmanian form—*Phaps elegans elegans*. Temm.

Upper brown. Throat chestnut. Part wings bronze. Bill blackish. Feet red.

Dimensions—Length, 305 mm. Bill, 20 mm. Wing, 160 mm. Tail, 100 mm. Tarsus, 27 mm.

Nest and Eggs—Nest of twigs. Eggs (2) white (31 mm. x 24 mm.). Nests October to January.

References—Gould, Birds of Australia, Vol. V., pl. 65. Mathews, Birds of Australia, Vol. I., pl. 36.

The remarks made in reference to the Bronze-wing also apply to this species. Generally speaking it is rarer than the former species, and is of a more retiring nature.

### ORDER RALLIFORMES (Rail-like Birds).

The members of the above order are all wading birds, in which the hind toe is raised above the others. The order is very cosmopolitan in character, and the Tasmanian representatives do not differ in any marked degree from their near relations which are to be found inhabiting the swamp lands of other countries. The Native Hen (*Tribonyx mortieri*) is the only species that need be excepted from the foregoing remark. This species is typical of Tasmania, and there are not many portions of the country in which one will travel without seeing or hearing a few Native Hens. When we speak of most portions of the country, however, the large areas of the western portion of the island must be excepted, for here the dense myrtle scrub and thick undergrowth is favourable to the existence of but few forms of bird life.

## SLATE BREASTED (LEWIN'S) RAIL.

*Rallus pectoralis*, Temm. & Lang.*Rallus pectoralis*, Temm. & Lang, Planch Col. d'Ois (1831).

Range—Tasmania and Australia, also New Guinea and Auckland Island.

Tasmanian form—*Rallus pectoralis pectoralis*, Temm. & Lang.

Dark chestnut brown. Upper streaked black. Throat white. Breast slate. Bill brown. Tarsi and feet flesh colour.

Dimensions—Length, 220 mm. Bill, 33 mm. Wing, 105 mm. Tail, 50 mm. Tarsus, 30 mm. Female slightly smaller.

Nest and Eggs—Nest of grass, in swamp. Eggs (4-6) pale buff, blotched brown and purple (36 mm. x 28 mm.). Nests September to December.

References—Gould, Birds of Australia, Vol. VI., pl. 77. Mathews, Birds of Australia, Vol. I., pl. 46.

Lewin's Rail (or Water Rail) could be met with quite close to Hobart within recent years, but the advance of settlement has driven it further afield. Low grassy swamps are its favourite haunts, and it is here that it nests. It is an excellent swimmer and diver.

## BUFF-BANDED RAIL.

*Hypotaenidia philippensis*, Linn.*Rallus philippensis*, Linn., Syst. Nat. (1766), I., 263.

Range—Tasmania and Australia, also N.Z. and certain of the islands in the Pacific.

Tasmanian and Australian form—*Hypotaenidia philippensis australis*, Pelzeln, Ibis. (1873), p. 42.

General colour olive brown, spotted white. Light stripe above eye. Under grey, barred black and white. Buff band on chest. Bill brown. Tarsi and feet brownish.

Dimensions—Length, 320 mm. Bill, 33 mm. Wing, 150 mm. Tail, 65 mm. Tarsus, 40 mm. Female slightly smaller.

Nest and Eggs—Nest of grass, near water. Eggs (5-8) whitish, blotched brown and purple (35 mm. x 25 mm.). Nests September to December.

References—Gould, Birds of Australia, Vol. VI., pl. 76. Mathews, Birds of Australia, Vol. I., pl. 47.

The Buff-banded Rail (or Land Rail) is a migratory form arriving in the early spring, and departing in early autumn. Its favourite localities are marshy flats, but it is not common except in a very few localities.

## SPOTTED CRAKE.

*Porzana fluminea*, Gould.*Porzana fluminea*, Gould, P.Z.S. (1842), p. 139.

Range—Tasmania and Eastern Australia.

Tasmanian form—*Porzana fluminea fluminea*, Gould.

Upper dark brown, spotted white, under grey. Abdomen white. Bill red, tipped green. Tarsi and feet brownish.

Dimensions—Length, 175 mm. Bill, 20 mm. Wing, 95 mm. Tail, 45 mm. Tarsus, 27 mm.

Nest and Eggs—Nest of grass. Eggs (4-5) brownish olive, spotted reddish (32 mm. x 22 mm.). Nests September to December.

References—Gould, Birds of Australia, Vol. VI., pl. 79. Mathews, Birds of Australia, Vol. I., pl. 51.

An inhabitant of the swamps and marshes of the lesser settled areas, the Spotted Crake is not often seen by the casual observer.

## LITTLE CRAKE.

*Porzana pusilla*, Pallas.*Porzana pusilla*, Pallas, Reise Russ. Reichs. (1776), III., p. 700.

Range—Tasmania and Australia, through Asia to Europe.

Tasmanian form—*Porzana pusilla palustris*, Gould, P.Z.S. (1842), p. 139.

Upper brown, with black and white markings. Under grey, band black and white on flanks. Bill, tarsi and feet brownish green.

Dimensions—Length, 155 mm. Bill, 16 mm. Wing, 85 mm. Tail, 42 mm. Tarsus, 25 mm.

Nest and Eggs—Nest of rushes in swamp. Eggs (4-8) brown, spotted olive (27 mm. x 19 mm.). Nests October to January.

References—Gould, Birds of Australia, Vol. VI., pl. 80. Mathews, Birds of Australia, Vol. I., pl. 52.

The Little Crake is a true swamp dweller, and is only to be seen by careful observation. This species can swim and dive well.

## SPOTLESS CRAKE.

*Porzana plumbea*, Gray.*Crex plumbea*. Grey, Cuv. Ann. Kd. (1829), VIII., p. 410

Range—Australasia and to the North.

Tasmanian form—*Porzana plumbea immaculata*, Swainson, An. in Menag. (1837), p. 337.

Upper dark brown. Under slate grey. Throat whitish. Bill black. Legs reddish.

Dimensions—Length, 185 mm. Bill, 22 mm. Wing, 83 mm. Tail, 53 mm. Tarsus, 30 mm.

Nest and Eggs—Nest of grass on ground. Eggs (4) whitish, mottled brown (28 mm. x 21 mm.).

References—Gould, Birds of Australia, Vol. VI., pl. 82. Mathews, Birds of Australia, Vol. I., pl. 53.

The Spotless Crake is rather a rare bird in Tasmania.

## TASMANIAN NATIVE HEN.

*Tribonyx mortieri*, Du Bus.*Tribonyx mortieri*. Du Bus., Bull. Acad. R. Sc. Brux. (1840), Vol. VII., p. 214.

Range—Tasmania.

Upper olive brown, under slate grey. White patch on side. Tail black. Bill and legs yellowish.

Dimensions—Length, 505 mm. Bill, 40 mm. Wing, 190 mm. Tail, 95 mm. Tarsus, 77 mm. Female slightly smaller.

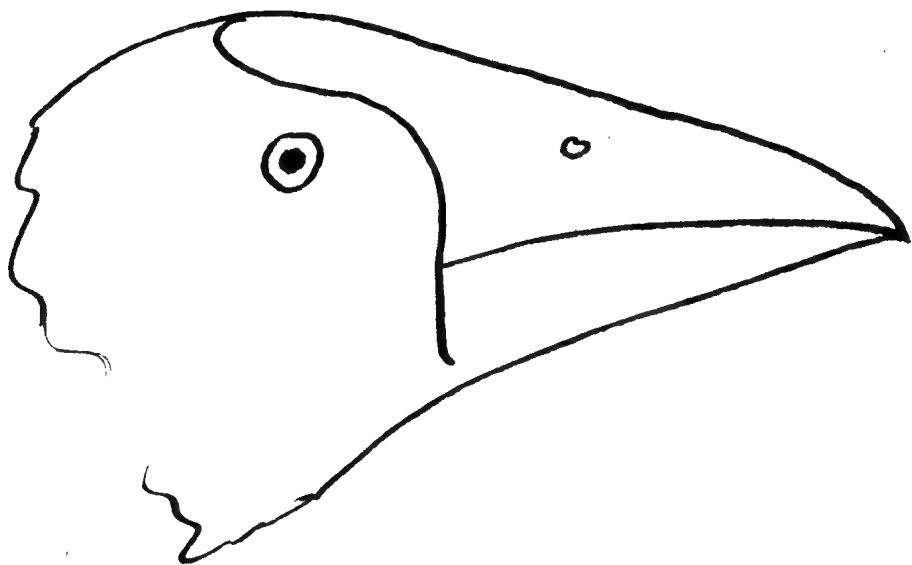
Nest and Eggs—Nest of grass, near water. Eggs (6-9) stone colour, spotted, reddish purple (60 mm. x 40 mm.). Nests September to December.

References—Gould, Birds of Australia, Vol. VI., pl. 71. Mathews, Birds of Australia, Vol. I., pl. 55.

The Native Hen is an endemic species, which is to be met with in most places in Tasmania which are suitable to its habits. Tussocky, grassy flats and along the banks of rivers are its favourite haunts. It runs exceedingly fast, and many dogs cannot catch a native hen even in open country. The Native Hen has a very weird and distinctive note, especially when the birds are excited, resembling the sharpening of a crosscut saw.



## BLACK-BACKED SWAMP HEN (Bald Coot).

*Porphyrio melanotus*, Temminck.*Porphyrio melanotus*, Temminck, Manuel d'orn (1820), I., p. 701.

Range—Tasmania and Australia.

Tasmanian form—*Porphyrio melanotus fletcheræ*, Mathews, Birds of Australia (1911), Vol. I., p. 24.

Back, wings, and tail black. Neck, breast, and flanks indigo blue. Under tail white. Bill crimson.

Dimensions—Length, 520 mm. Bill, 75 mm. Wing, 300 mm. Tail, 112 mm. Tarsus, 97 mm.

Nest and Eggs—Nest of herbage, in swamp. Eggs (4-7) greyish, spotted red-dish (53 mm. x 36 mm.). Nests August to November.

References—Gould, Birds of Australia, Vol. VI., pl. 69. Mathews, Birds of Australia, Vol. I., pl. 59.

The "Bald Coot" is a very familiar object around Tasmanian lakes and lagoons, and amidst the reedy portions of the river flats.

## COOT.

*Fulica atra*. Schlegel.

Range—Tasmania and Australia, Asia, Europe, &amp;c.

Tasmanian form—*Fulica atra tasmanica*, Grant, Tas. Jrn. (1845), II., p. 310.

Upper greyish black, under sooty black. Bill greyish. Legs and feet blackish grey.

Dimensions—Length, 385 mm. Bill, 40 mm. Wing, 185 mm. Tail, 45 mm. Tarsus, 55 mm.

Nest and Eggs—Nest near water. Eggs (7-9) stone colour, spotted blackish (50 mm. x 33 mm.). Nests September to December.

References—Gould, Birds of Australia, Vol. VI., pl. 74. Mathews, Birds of Australia, Vol. I., pl. 61.

The Tasmanian form is generally recognised as sub-specifically distinct, but in dry seasons especially there is a tremendous migration of Coot from the mainland to Tasmania. Last year (1921) the Derwent and other rivers and lakes were the temporary homes of thousands of Coots, but these vanished as quickly as they appeared.

#### ORDER *PODICIPEDIDIFORMES* (Grebe-like Birds).

The Grebes and other similar species which constitute this order are all swimming birds, which have become adapted for an aquatic existence. The wings are short, with quill-like feathers. These birds are generally referred to as "Divers" in Tasmania, and small flocks can be seen nearly always in the larger lakes or on the inland arms of the sea.

These birds have straight and fairly long bills, the wings are short and rounded, whilst the tail is rudimentary. The feet have large lobe-like webs.

#### LITTLE GREBE.

*Podiceps ruficollis*, Vroeg.

"*Colymbus ruficollis*, Vroeg., Cat. Rais. d'Ois Adumb., p. 6, 1764," Mathews.

Range—Tasmania; Australia, northward.

Tasmanian form—*Podiceps ruficollis novæ-hollandiæ*, Stevens, Shaw Gen. Zool. (1826), XIII., p. 18.

Head and throat black. Chestnut bar down side of neck. Upper brownish white on wing. Under silvery grey. Winter plumage, head and neck grey. Bill black, white tip. Legs greyish.

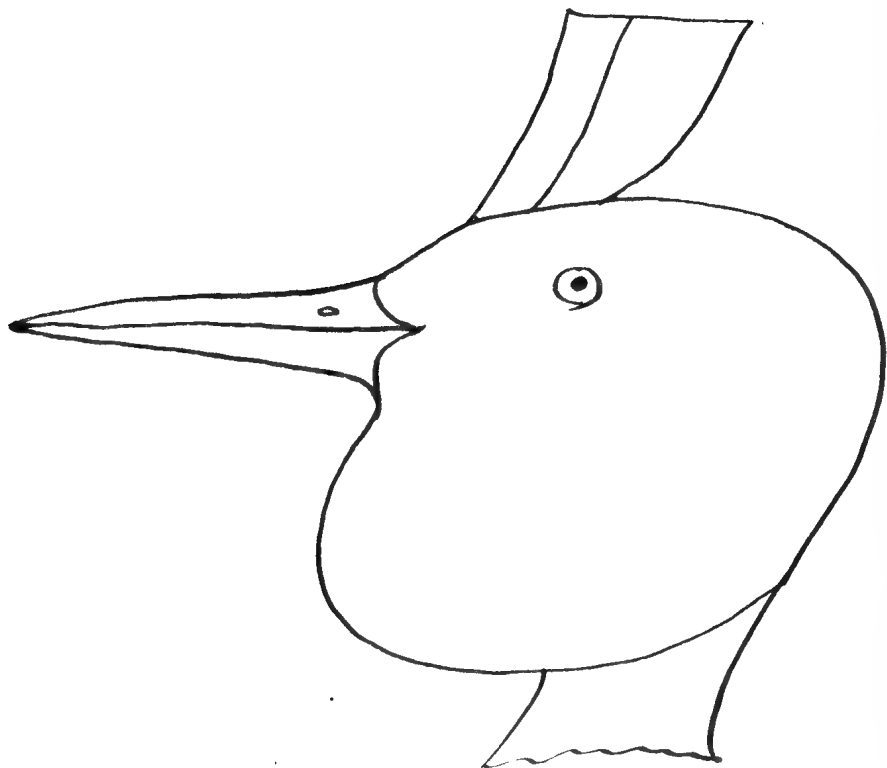
Dimensions—Length, 245 mm. Bill, 25 mm. Wing, 110 mm. Tarsus, 34 mm.

Nest and Eggs—Nest of herbage, in water. Eggs (5-7) bluish white line, coated (34 mm. x 25 mm.). Nests October to January.

References—Gould, Birds of Australia, Vol. VII., pl. 81. Mathews, Birds of Australia, Vol. I., pl. 62.

This species may be seen in the inland streams and lakes. A few may occasionally be seen in the upper waters of the Derwent near Bridgewater. Also known as the Red-necked or Black-throated Grebe or "Dabchick."

## TIPPET GREBE.

*Podiceps cristatus*, Linnæus.*Colymbus cristatus*. Linn., Syst. Nat. (1758), X., p. 135.

Range—Tasmania, Australia, and practically cosmopolitan.

Tasmanian form—*Podiceps cristatus cristiana*, Mathews, Birds of Australia (1911), I., p. 267.

Upper brown. Under white. Chestnut ruff on neck. Crest black. Bill, legs and feet yellowish.

Dimensions—Length, 525 mm. Bill, 50 mm. Wing, 175 mm. Tarsus, 55 mm.

Nest and Eggs—Nest of herbage, in water. Eggs (5-7) white line, coated (50 mm. x 35 mm.). Nests October to December.

References—Gould, Birds of Australia, Vol. VII., pl. 80. Mathews, Birds of Australia, Vol. I., pl. 64.

We do not consider that the Tippet Grebe is as plentiful in Tasmania as either the Little or the Hoary-headed species. The larger lakes of the central highlands are its most favoured resorts, but it is occasionally seen on the Derwent and certain saltwater estuaries, as well as on the inland lakes.

## HOARY HEADED GREBE.

*Podiceps poliocephalus*, Jardine & Selby.

*Podiceps poliocephalus*, Jard. & Selby, III., Orni. (1827), Vol. I., pl. 13.

Range—Tasmania and Australia.

Tasmanian form—*Podiceps poliocephalus poliocephalus*.

Upper greyish brown. Under white, white patch on wing. Bill black, tipped pink. Legs and feet greenish.

Dimensions—Length, 270 mm. Bill 25 mm. Wing, 110 mm. Tarsus, 35 mm.

Nest and Eggs—Nest of herbage, in water. Eggs (4-5) greenish white line, coated (39 mm. x 27 mm.). Nests October to January.

References—Gould, Birds of Australia, Vol. VII., pl. 82. Mathews, Birds of Australia, Vol. I., pl. 63.

The Hoary-headed Grebe is to be met with on the inland lakes, such as the Great Lake where, only a few days ago (March, 1922), we observed a fairly large number. It is also to be met with in such arms of the sea as Pittwater. This species is also known (in addition to the previous species) as the "Dabchick."

## ORDER PROCELLARIFORMES (Tubinares), (Petrel-like Birds).

This order contains the wanderers of the ocean, and it is difficult to say, with any degree of certainty, exactly how many species belonging to this order are inhabitants of, or visitors to, the seas of Tasmania.

All the *Procellariformes* are sea birds with webbed feet, and have prominent tubular nostrils. These true denizens of the ocean range in size from the tiny Stormy Petrels (*Hydrobatidæ*) to the immense Albatrosses (*Diomedeidæ*), whose aerial evolutions are ever a source of wonder to all who know the sea.

On account of the prominent tubular nostrils these birds can be easily separated from those of other orders, and the name Petrel is derived from Petrella or Little Peter, from their habit of appearing to walk on the sea.

Reference—Alexander, The Emu, Vol. XX., pp. 14 and 66.

## YELLOW-WEBBED STORM PETREL (Wilson Storm Petrel).

*Oceanites oceanicus*, Kuhl.*Procellaria oceanica*, Kuhl. V.V., Anat. (1820), p. 136.

Range—Seas of Tasmania, and from Antarctic to Labrador.

Tasmanian form—*Oceanites oceanicus exasperatus*, Mathews, Birds of Australia (1912), Vol. II., p. 68.

Sooty black. Base of tail, wing coverts fringed white. Bill black. Feet black. Webs yellow.

Dimensions—Length, 185 mm. Bill, 14 mm. Wing, 155 mm. Tail, 70 mm. Tarsus, 35 mm.

Nest and Eggs—Breeds Antarctic. Nest in burrow. Egg (1) white (33 mm. x 22 mm.). Nests January.

References—Gould, Birds of Australia, Vol. VII., pl. 65. Mathews, Birds of Australia, Vol. II., pl. 68.

The true home of this species appears to be the far Southern Oceans, but it is met with on the Tasmanian coasts and to the North.

## GREY-BACKED STORM PETREL.

*Garrodia nereis*, Gould.*Thalassidroma nereis*, Gould, P.Z.S. (1840), p. 178.

Range—Seas of Tasmania and Southern Oceans.

Tasmanian form—*Garrodia nereis nereis*, Gould.

Sooty black. Tail coverts grey. Under surface white. Bill and legs black.

Dimensions—Length, 180 mm. Bill, 12 mm. Wing, 130 mm. Tail, 70 mm. Tarsus, 30 mm.

Nest and Eggs—Breeds New Zealand. Nest in burrow. Egg (1) white, dotted fine brown spots round end (33 mm. x 24 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 64. Mathews, Birds of Australia, Vol. II., pl. 69.

The type specimen of this species was collected by Gould at the eastern end of Bass Strait in 1839.

## WHITE-FACED STORM PETREL.

*Pelagodroma marina*, Latham.*Procellaria marina*, Latham, Index Orn. (1790), II., p. 826.

Range—Seas of Tasmania, Southern Oceans and North to the Indian and Atlantic Oceans.

Tasmanian form—*Pelagodroma marina howei*, Mathews, Birds of Australia (1912), Vol. II., p. 26.

Crown of head slaty. Upper greyish. Under whitish. Sides of head white. Black patch round eye. Bill and feet black. webs yellow, fringed black.

Dimensions—Length, 207 mm. Bill, 18 mm. Wing, 155 mm. Tail, 75 mm. Tarsus, 40 mm.

Nest and Eggs—Nest in burrows. Egg (1) white, spotted finely round end (38 mm. x 25 mm.). Nests November to January.

References—Gould, Birds of Australia, Vol. VII., pl. 64. Mathews, Birds of Australia, Vol. II., pl. 69.

The White-faced Storm Petrel breeds on the islands off the Tasmanian coasts, and Littler (Birds of Tasmania, p. 161) has given some interesting information concerning a rookery on Ninth Island, in Bass Strait.

### GOULD STORM PETREL (Black-bellied Storm Petrel).

*Fregetta tropica*, Gould.

*Thallissodroma tropica*, Gould. A.M.N.H. (1884), XIII., p. 136.

Range—Tasmanian seas (?), Southern Oceans, and North to Atlantic.

Tasmanian form—*Fregetta tropica australia* (?). Mathews, Australian A. Rec. (1914), V., II., p. 86.

Head, breast, and upper surface sooty black. Tail coverts white. Bill and feet black.

Dimensions—Length, 200 mm. Bill, 14 mm. Wing, 165 mm. Tail, 70 mm. Tarsus, 40 mm.

Nest and Eggs—Nest in crevice of rock. Egg (1) white, spotted pink (37 mm. x 27 mm.).

References—Gould, Birds of Australia, Vol. VII. pl. 62. Mathews, Birds of Australia, Vol. II., pl. 71.

Very little is known concerning this Petrel as an Australian form, and it is doubtful if it should be included in the Tasmanian faunal list. So little is known, however, of these Southern forms that we give the description and references in the hope that they may assist in the identification of a specimen if such should be secured.

### VIEILLOT STORM PETREL (White-bellied Storm Petrel).

*Fregettornis grallaria*, Vieillot.

*Procellaria grallaria*, Vieillot, No. Dict. d' Hist. Nat. (1817), XXV., p. 418.

Range—Seas of Tasmania, Australia, &c.

Upper sooty grey. Under whitish. Tail coverts white. Bill and feet black.

Dimensions—Length, 215 mm. Bill, 14 mm. Wing, 164 mm. Tail, 80 mm. Tarsus, 37 mm.

Nest and Eggs—Nest in burrow. Egg (1) white, slightly spotted brown (33 mm. x 52 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 63. Mathews, Birds of Australia, Vol. II., pl. 72.

The remarks made in connection with the Black-bellied Storm Petrel also refer to this species.

### WEDGE-TAILED SHEARWATER (PETREL).

*Puffinus pacificus*, Gmelin.

*Procellaria pacifica*, Gmelin, Syst. Nat. (1789), II., p. 560.

Range—Seas of Tasmania and the Pacific and Indian Oceans.

Tasmanian form—*Puffinus pacificus rovanus*, Mathews, Birds of Australia (1912), Vol. II., pl. 75. Tasmanian and Eastern Australian Seas.

Upper brownish black. Tail black. Under pale brown. Bill, legs and feet yellowish.

Dimensions—Length, 440 mm. Bill, 40 mm. Wing, 300 mm. Tail, 120 mm. Tarsus, 45 mm.

Nest and Eggs—Nest in burrow. Egg (1) white (63 mm. x 41 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 58. Mathews, Birds of Australia, Vol. II., pl. 75.

The Wedge-tailed Petrel breeds in the islands off the coast of East and West Australia. We have no personal records relating to this species in Tasmanian seas, but there can be no doubt that occasionally, at least, some individuals of this species reach the shores of Tasmania. It may be mistaken for the common "Mutton Bird" (*P. tenuirostris*) of Tasmania, but its longer and wedge-shaped tail compared with the short tail of the "Mutton Bird" serves as an easy key to identification.

### FLESHY-FOOTED SHEARWATER.

*Puffinus carneipes*, Gould.

*Puffinus carneipes*, Gould, A.M.N.H. (1844), XIII., p. 365.

Range—Southern Seas and North of California and Japan.

Upper sooty black. Under paler. Bill brownish. Legs and feet flesh colour.

Dimensions—Length, 455 mm. Bill, 40 mm. Wing, 310 mm. Tail, 105 mm. Tarsus, 55 mm.

Nest and Eggs—Breeds in Western Australia. Nest in burrow. Egg (1) white (70 mm. x 47 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 57. Mathews, Birds of Australia, Vol. II., pl. 76.

This is another of the species which Alexander (Emu, Vol. XX., p. 73) has classed as an Australian breeding species. He places it as breeding in the South-west region of the Australian coast line.

## SHORT-TAILED SHEARWATER (Mutton Bird.)

*Puffinus tenuirostris*, Temminck et Langier.

("Procclaria tenuirostris, Temminck et Langier, Plan. Color. d'ois 99e lirr., Vol. V., pl. 587, 1835)," Mathews.

Tasmanian form—*Puffinus tenuirostris brevicaudus*, Gould, Birds of Australia (1847), Vol. VII., pl. 565.

Entire plumage sooty black. Paler under. Bill and legs dark greenish black.

Dimensions—Length, 410 mm. Bill, 34 mm. Wing, 280 mm. Tail, 80 mm. Tarsus, 50 mm.

Nest and Eggs—Nest in burrow. Egg (1) white (70 mm. x 50 mm.). Nest September. Eggs laid in November. Young do not leave nests until April or May.

References—Gould, Birds of Australia, Vol. VII., pl. 56. Mathews, Birds of Australia, Vol. II., pl. 78.

In some ways the Short-tailed Petrel, or "Mutton Bird," as it is universally called in Tasmania, is one of the most interesting species. The mutton birding (or to get the correct local pronunciation "bairding") industry is one of the chief sources of income of many of the inhabitants of the Bass Straits islands, and in some of the more remote settlements even time is recorded by the "bairding" season, as its importance is paramount.

After spending months away in distant seas, the mutton birds re-appear at the rookeries towards the end of September. After spending some time cleaning out the burrows the birds leave for sea again, and after this commences that wonderful series of events which is carried out with clock-work regularity as regards time and dates, year after year. On the 25th November the birds return to the rookeries, and the laying season commences. This continues until 5th of December, but only one egg is laid, and this takes about eight weeks to hatch, and if the egg is taken a second one is not laid. During the incubation period the cock bird sits on the egg for the first fortnight, and the hen bird feeds him, then the hen bird takes her turn on the nest for a fortnight, and this is repeated until the egg is hatched.

The young birds are ready to be taken towards the end of March, and the birding season, which is regulated by law, lasts from 20th March until 20th May. The young birds are taken from the burrows, prepared, and exported.

In spite of the thousands that are secured by the birders, thousands survive, and as soon as a suitable wind arrives these young birds that are able to fly take advantage of the gale in order to try their first flight. The parent birds leave the rookeries long before this. We are much indebted to Senior Constable Mansfield, of Flinders Island, for much detailed information in regard to this species, and have had pleasure in visiting certain of the localities which came within his realm of office.

It needs actual experience to appreciate the enormous number of these birds, and in spite of all that we have read on the subject we were hardly prepared for the experience we had on our first visit to one of the large rookeries in Bass Straits. It was during the period in which the birds were preparing the burrows, and we landed on the island late in the afternoon. In walking over the tussocky grass slopes we had to be careful, for the whole locality was honeycombed with burrows. A few stray birds could be heard in the burrows, these not having gone to sea with the main flock. If any of these birds were pulled out of their nesting holes—and it needs practice to do it without being bitten—they flopped about the ground in a very unwilling manner until they reached a knoll or cliff, or else met a suitable current of wind, as they are unable to rise from the ground without some assistance in the way of a "take off."



Towards dusk a low line on the rapidly dimming horizon foretold the arrival of the returning host, and in a few minutes the air was thick with flying birds, whose numbers increased every moment as fresh flocks began to arrive. The air was simply full of petrels, flying over the rookery with the rapidity of swifts, and as they began to settle in the burrows the din became indescribable, the noise continuing for many hours, but with the first streak of dawn the great host departed silently for the sea.

### LITTLE SHEARWATER (Allied Petrel).

*Puffinus assimilis*, Gould.

*Puffinus assimilis*, Gould, Syn. Birds Aust. (1827), IV., app., p. 7.

Range—Seas of Tasmania, Southern Ocean, and North of Atlantic.

Upper brownish black. Cheeks white. Under white. Bill bluish black. Tarsi greyish black. Webs yellow.

Dimensions—Length, 300 mm. Bill, 25 mm. Wing, 180 mm. Tail, 65 mm. Tarsus, 37 mm.

Nest and Eggs—Breeds in Western Australia. Nest in burrow. Egg (1) white (50 mm. x 36 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 59. Mathews, Birds of Australia, Vol. II., pl. 73.

This species breeds on Houtman's Abrolhos Islands, off the coast of Western Australia, and also off the Southern Coast. As with many other of the sea birds, further detailed investigation is required before the exact position of the species in relation to its Tasmanian aspect is decided.

### BROWN (OR GREY) PETREL.

*Procellaria cinerea*, Gmelin.

*Procellaria cinerea*, Gmelin, Syst. Nat., I. (1789), p. 563.

Range—Southern Oceans.

Upper surface ash grey, splashed brown. Under greyish white. Bill yellowish black. Legs and feet greyish. Webs yellowish.

Dimensions—Length, 475 mm. Bill, 50 mm. Wing, 335 mm. Tail, 110 mm. Tarsus, 55 mm.

Nest and Eggs—Breeds Macquarie Island (October to December). Nests in burrow. Egg (1) white (70 mm. x 50 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 47. Mathews, Birds of Australia, Vol. II., pl. 81.

In the absence of preserved authentic specimens, Mathews, who is a cabinet ornithologist, is inclined to debar this species from the Australian lists. As, however, the species breeds on Macquarie Island (which is politically, if not geographically, attached to Tasmania), and there are authentic field observations concerning the occurrence of this species in Bass Strait and East Australian seas, we have included it in the Tasmanian list.

## SPECTACLED PETREL.

*Procellaria conspicillata*, Gould.*Procellaria conspicillata*, Gould, A.M.N.H. (1844), XIII., p. 362.

Range—Southern Pacific and Atlantic Oceans.

General colour sooty black. Chin white, the band extending to beyond the eyes. A frontal band connecting across in front of eyes.

Dimensions—(According to Mathews and Iredale) Length, 476 mm. Bill, 53 mm. Wing, 368 mm. Tail, 105 mm. Tarsus, 66 mm.

References—Gould, Birds of Australia, Vol. VII., pl. 46. Mathews, Birds of Australia, Vol. II., pl. 79.

The position of this species is one of doubt as far as Tasmania is concerned. Mathews considers that this species should be removed from the Australian list, whilst Alexander, guided in the main by Gould's statements, considers that its admission is correct. This species should not be confused with the White-chinned Petrel (*P. aequinoctialis*).

## WHITE-CHINNED PETREL.

*Procellaria aequinoctialis*, Linnaeus.*Procellaria aequinoctialis*, Linn, Syst. Nat., 10th Ed. (1758), p. 131.

Range—Southern Oceans.

General colour sooty black. Chin only white.

Dimensions—Length, 510 mm. Bill, 56 mm. Wing, 388 mm. Tail, 122 mm. Tarsus, 67 mm. (Mathews and Iredale.)

Nest and Eggs—Nest in burrow. Egg (1) white (86 mm. x 52 mm.).

Reference—Mathews and Iredale, Manual of Birds of Australia, Vol. I., pl. VI., fig. 2, and pl. VII., fig. 9.

The right for this species to appear on the Australian lists is upheld by Mathews, but Alexander considers that it should be removed.

As with several other Tasmanian species (birds, lizards, frogs, etc.), there is a specimen of the species in the British Museum which gives Tasmania as the locality in which it was collected, and yet there are no further records. Refer to remarks re previous species (*P. conspicillata*).

## BLACK PETREL.

*Procellaria parkinsoni*, Gray.*Procellaria parkinsoni*, Gray, IBIS (1862), p. 245.

Entire plumage sooty black. Bill yellow. Feet black.

Dimensions—Length, 550 mm. Bill, 45 mm. Wing, 350 mm. Tail, 110 mm. Tarsus, 55 mm.

Nest and Eggs—Breeds New Zealand. Nest in burrow. Egg (1) white (70 mm. x 50 mm.).

Reference—Mathews, Birds of Australia, Vol. II., p. 80.

The Black Petrel breeds in the New Zealand region, and individuals of this species undoubtedly visit Australian waters. There is one specimen, secured in the East Coast of Australia, and competent observers have been of the opinion that they have seen it in Australian waters.

## SILVER-GREY PETREL.

*Priocella antarctica*, Stevens.

*Fulmous antarticus*, Stevens, Shaw's Gem. Zool. (1826), XIII., p. 236.

Range—Southern oceans.

Upper surface silvery grey. Head white. Bill pink, blue base. Tarsi and feet pink.

Dimensions—Length, 475 mm. Bill, 45 mm. Wing, 335 mm. Tail, 125 mm. Tarsus, 50 mm.

References—Gould, Birds of Australia, Vol. VII., pl. 48. Mathews, Birds of Australia, Vol. II., pl. 82.

This species undoubtedly breeds among some of the Antarctic islands. As with other representatives of the order, it is an occasional, if not regular, visitor to the seas of Tasmania.

## GREAT-WINGED FULMAR (Grey-faced Petrel).

*Pterodroma macroptera*, Smith.

*Procellaria macroptera*, Smith, Zool. S. Af. (1840), pl. 52.

Range—Southern oceans.

Sooty black. Forehead and neck grey. Bill and feet black.

Dimensions—Length, 380 mm. Bill, 35 mm. Wing, 310 mm. Tail, 110 mm. Tarsus, 40 mm.

Nest and Eggs—Breeds Western Australia. Nest in burrows. Egg (1) white (70 mm. x 50 mm.).

Reference—Mathews, Birds of Australia, Vol. II., pl. 83.

The Great-winged Petrel breeds in the islands off the coast of Western Australia. Gould recorded it as plentiful off the coasts of Tasmania in 1839.

## WHITE-HEADED FULMAR.

*Pterodroma lessoni*, Garnot.*Procellaria lessoni*, Garnot, Ann. des Sci. Nat. (1826), VII., p. 54.

Range—Southern oceans.

Tasmanian form—*Procellaria lessoni australis*, Mathews, Aust. Avian. Record (1916), III., p. 54.

Upper surface greyish brown. Head and under white. Brown ring round eye. Bill slatish. Legs and feet pink.

Dimensions—Length, 420 mm. Bill, 36 mm. Wing, 310 mm. Tail, 135 mm. Tarsus, 45 mm.

Nest and Eggs—Nest in burrow. Egg (1) white (70 mm. x 50 mm.).

References—Gould, Birds of Australia, Volume VII., pl. 49. Mathews, Birds of Australia, Vol. II., pl. 85.

Alexander states (Emu, XX., pl. 23) that the White-headed Petrel is not uncommon during the winter months in the seas to the south of Australia.

## MOTTLED FULMAR.

*Pterodroma inexpectata*, Forster.*Procellaria inexpecta*, Forster (1844).

Range—Southern Oceans, also North Pacific and Atlantic.

(After Mathews.) General colour of upper surface hoary grey, and throat white. Breast, abdomen and sides of body dusky brown, with white bases to feathers. Bill black, tarsi fleshy, feet black, with base of inner web whitish.

Dimensions—(According to Mathews.) Length, 283 mm. Culmen, 25 mm. Wing, 251 mm. Tail, 93 mm. Tarsus, 35 mm.

Nest and Eggs—Unknown.

Reference—Mathews, Birds of Australia, Vol. VII., pl. 368.

The Mottled Petrel most probably breeds in the islands to the south of New Zealand. That it occasionally visits the coasts of Tasmania is proved by the fact that Mathews has recorded (Aust. Av. Rec., II., p. 125) a specimen from Circular Head.

## BROWN-HEADED (SOLANDER'S) FULMAR.

*Pterodroma melanopus*, Gmelin.*Procellaria melanopus*, Gmelin, Syst. Nat. (1789), I., p. 562.

Range—Extent of distribution unknown. Breeds Lord Howe Island.

Upper slatish brown. Forehead and neck pale brown. Under pale greyish brown. Bill, legs and feet black.

Dimensions—Length, 450 mm. Bill, 40 mm. Wing, 300 mm. Tail, 130 mm. Tarsus, 40 mm.

Nest and Eggs—Breeds Lord Howe Island. Nest of grass. Egg (1) white (63 mm. x 44 mm.).

Reference—Mathews, Birds of Australia, Vol. II., pl. 84.

This species, as far as Tasmania is concerned, serves to illustrate a previous remark of ours, as but a single specimen from Tasmanian waters (Bass Straits) is known. This specimen is in the British Museum, and was obtained by Gould in March, 1839.

## WHITE-WINGED FULMAR.

*Pterodroma leucoptera*, Gould.

*Procellaria leucoptera*, Gould, A.M.N.H. (1844).

Range—Pacific Ocean.

Upper surface and head sooty black. Entire under surface white. Bill black. Legs flesh colour. Feet black.

Dimensions—Length, 310 mm. Bill, 25 mm. Wing, 215 mm. Tail, 95 mm. Tarsus, 30 mm.

Nest and Eggs—Nest on ground. Egg (1) white (50 mm. x 37 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 51. Mathews, Birds of Australia, Vol. II., pl. 88.

The White-winged Petrel breeds off the New South Wales Coast. Gould's type of the sub-species is included in the famous Gould collection of Australian birds, which is the property of the Academy of Natural Sciences of Philadelphia, U.S.A. (Alexander, Emu, Vol. XX., p. 225).

## GIANT PETREL.

*Macronectes giganteus*, Gmelin.

*Procellaria gigantea*, Gmelin, Linn. Syst. Nat. (1789), I., p. 563.

Range—Southern oceans.

Tasmanian form—*Macronectes giganteus dovei*, Mathews, Aust. Av. Rec. (1916), III., p. 54.

Sooty black (also white phase). Bill yellowish. Legs and feet grey.

Dimensions—Length, 850 mm. Bill, 110 mm. Wing, 520 mm. Tail, 175 mm. Tarsus, 95 mm.

Nest and Eggs—Nest on ground. Egg (1) white (100 mm. x 65 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 45. Mathews, Birds of Australia, Vol. II., pl. 89.

Considerable research is needed to locate exactly the range areas and colour phases of the giant of the Petrels. Several sub-species have been described, but further details are necessary before the exact position of these can be stated with any degree of certainty. The specimen from which the above measurements were taken was a male specimen secured at Sorell.

## CAPE, OR SPOTTED PETREL.

*Daption capensis*, Linnæus.*Procellaria capensis*, Linn., Syst., Nat. (1758), p. 132.

Range—Southern oceans.

Tasmanian form—*Daption capense australis*. Mathews, Aust. Av. Rec. (1913), I., p. 187.

Head brown. Above greyish brown, spotted white. Tail brown. Under white. Bill, legs and feet blackish brown.

Dimensions—Length, 375 mm. Bill, 40 mm. Wing, 175 mm. Tail, 130 mm. Tarsus, 45 mm.

Nest and Eggs—Nests on cliff. Egg (1) white (62 mm. x 42 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 53. Mathews, Birds of Australia, Vol. II., pl. 90.

The Cape Petrel (or Cape Pigeon) can be immediately recognised by its spotted plumage. It appears to be more plentiful in the Southern Tasmanian seas than in the Straits.

## BLUE PETREL.

*Halobaena cærulea*, Gmelin.*Procellaria cærulea*, Gmelin, Syst. Nat. (1789), I., p. 560.

Range—Southern oceans.

Upper surface blue-grey. Under white, tail bluish-grey, tipped white. Bill brown, legs blue, webs red, edged blue.

Dimensions—Length, 275 mm. Bill, 25 mm. Wing, 210 mm. Tail, 90 mm. Tarsus, 30 mm.

Nest and Eggs—Nest in burrow. Egg (1) white (45 mm. x 33 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 52. Mathews, Birds of Australia, Vol. II., pl. 91.

The Blue Petrel is another of the ocean wanderers, which are met with in the Tasmanian seas. Mathews has founded a sub-species (*H. c. victoriæ*, Aust. Av. Rec., III., p. 54) for the Victorian form. Further investigation is needed in order to prove its range.

## BROAD-BILLED PRION.

*Pachyptila vittata*, Gmelin.*Procellaria vittata*, Gmelin, Syst. Nat. (1789), I., p. 560.

Range—Southern oceans.

Tasmanian form—*Prion vittata gouldi*, Mathews.

Above bluish grey. Under white. Bill blue, tipped black. Legs blue. Webs pink.

Dimensions, Length, 330 mm. Bill, 33 mm. Wing, 212 mm. Tail, 103 mm. Tarsus, 33 mm.

Nest and Eggs—Nest in burrow. Egg (1) white (48 mm. x 35 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 55. Mathews, Birds of Australia, II., pl. 92 and 211.

Alexander states Emu (XX., p. 68) that specimens of this species "have been picked up dead on the beach after storms in all the Southern States during the winter." Mathews has (Birds of Australia, II., p. 211) separated the Bass Straits form (Tasmanian?) as *P. v. gouldi*.

### FAIRY PRION.

*Pachyptila turtur*, Kuhl.

*Procellaria turtur*, Kuhl, B.V. Zool. Anat. (1820), p. 143.

Range—Southern oceans.

Tasmanian form—*Prion turtur turtur*, Kuhl. (*Prion ariel*, Gould.)

Above blue and grey. Under white. Bill bluish. Legs blue. Webs yellow.

Dimensions—Length, 235 mm. Bill, 22 mm. (x 10 mm. wide). Wing, 170 mm. Tail, 80 mm. Tarsus, 30 mm.

Nest and Eggs—Nest in burrow or amid rocks. Egg (1) white (42 mm. x 32 mm.). Nests October to December.

References—Gould, Birds of Australia, Vol. VII., pl. 54. Mathews, Birds of Australia, Vol. II., pl. 93.

The Fairy Prion breeds in Bass Straits, which is the type locality of the species. As far as is known at present this is the only Prion which can be considered as breeding in Tasmanian seas.

### DOVE PRION.

*Pachyptila desolata*, Gmelin.

*Procellaria desolata*, Gmelin, Syst. Nat. (1789), I., p. 562.

Tasmanian form—*Pachyptila desolata mattingleyi*, Mathews, Birds of Australia (1912), Vol. II., p. 226.

Upper greyish blue. Under white. Bill, legs and feet bluish.

Dimensions—Length, 285 mm. Bill, 28 mm (x 12 mm. wide). Wing, 190 mm. Tail, 100 mm. Tarsus, 32 mm.

Nest and Eggs—Nest in burrow. Egg (1) white (44 mm. x 33 mm.).

Reference—Mathews, Birds of Australia, Vol. II., p. 226.

Considerable discussion has taken place concerning this species, and cabinet ornithologists have paid great attention to the culmen and its width in order to prove sub-species. We do not wish to add to the discussion beyond stating that specimens which have been picked up dead in Southern Tasmania show a culmen length of 28 mm., with a width of 12 mm.

Mathews has described (Birds of Australia, II., p. 224) a species (*P. belcheri*), he considers distinct, the culmen measurement being 25 mm. x 10 mm. wide.

## DIVING PETREL.

*Pelecanoides urinatrix*, Gmelin.

*Pelecanoides urinatrix*, Gmelin, Syst. Nat. (1789), I., p. 560.

Tasmanian form—*Pelecanoides urinatrix belcheri*, Mathews, Aust. Av. Rec. (1812), Vol. I., p. 84.

Upper surface bluish black. White on wing. Throat and under surface white. Bill bluish black. Feet black.

Dimensions—Length, 230 mm. Bill, 17 mm. (x 8 mm. wide). Wing, 130 mm. Tail, 43 mm. Tarsus, 24 mm.

Nest and Eggs—Nest in burrow. Egg (1) white, oval shaped (40 mm. x 32 mm.). Breeds October and November.

References—Gould, Birds of Australia, Vol. VII., pl. 60. Mathews, Birds of Australia, Vol. II., pl. 94.

The Diving Petrel breeds within the Tasmanian seas.

## WANDERING ALBATROSS.

*Diomedea exulans*, Linnæus.

*Diomedea exulans*, Linn., Syst. Nat. (1758), I., p. 214.

Range—Southern oceans.

Tasmanian form—*Diomedea exulans rothschildi*, Mathews, Birds of Australia, Vol. II., p. 246.

Head white. Upper surface whitish, marked greyish brown. Wings black, marked white. Tail, upper black, under white, brown tip. Under surface white. Bill, legs and feet whitish.

Dimensions—Length, 1400 mm. Bill, 150 mm. Wing, 650 mm. Tail, 200 mm. Tarsus, 125 mm.

Nest and Eggs—Nest of earth and grass. Egg (1) white, stained (125 mm. x 77 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 38. Mathews, Birds of Australia, Vol. II., p. 95.

The Great Wandering Albatross is a familiar sight, at any rate off the Southern and Eastern Coasts of Tasmania, and on occasions individuals have been seen far up the Derwent.



## SNOWY ALBATROSS.

*Diomedea chionoptera*, Salvin.*Diomedea chionoptera*, Salvin, Cat. Birds Brit. Mus., XXV., p. 443.

Range—Southern oceans.

General colour white, tinged brown in parts.

Dimensions—Length, 1050 mm. Bill, 165 mm. Wing, 600 mm. Tail, 195 mm. Tarsus, 123 mm.

Nest and Eggs—Nest of mud and grass. Egg (1) white (130 mm. x 82 mm.).

Reference—Mathews, Birds of Australia, Vol. VII., pl. 369.

There are no records, as far as we are aware, of this species in Tasmanian waters, and some authorities consider it should not occur in our lists. Owing to the immense range of the Albatross family we consider that we are fully justified in including it, and hope that the above may lead to the identification of a Tasmanian record.

## WHITE-CAPPED ALBATROSS.

*Diomedea cauta*, Gould.*Diomedea cauta*, Gould, P.Z.S. (1840), VIII., p. 177.

Range—Southern oceans.

Tasmanian form—*Diomedea cauta cauta*, Gould.

Head and neck white. Greyish patch round eye. Upper and tail slaty brown. Under white. Bill brownish colour. Legs and feet bluish white.

Nest and Eggs—Nest of soil and sticks. Egg (1) white (107 mm. x 67 mm.). Nests October to November.

References—Gould, Birds of Australia, Vol. VII., pl. 40. Mathews, Birds of Australia, Vol. II., pl. 100.

The type locality of the species is Recherche Bay, where Gould obtained the first specimen. The skin is now in the Gould collection in Philadelphia, U.S.A. Gould termed it the Shy Albatross, from the difficulty he had in approaching the birds. This species breeds in Bass Straits, and also probably on some of the other island around the coast. Many of these, particularly those to the South-west, are so difficult of access that it is no easy matter to investigate the rookeries.

## BLACK-BROWED ALBATROSS.

*Diomedea melanophrys*, Temminck.*Diomedea melanophrys*, Temminck (1824), p. 456.

Range—Southern oceans.

Tasmanian form—*Diomedea melanophrys imparida*, Mathews, Birds of Australia (1912), Vol. II., pl. 96.

Head white, with black brow over eye. Upper surface and wings brownish black. Upper black. Tail and under white. Tail white, tipped brown. Bill yellow. Legs and feet yellowish.

Dimensions—Length, 900 mm. Bill, 135 mm. Wing, 540 mm. Tail, 200 mm. Tarsus, 80 mm.

Nest and Eggs—Nest of mud. Egg (1) white, reddish spots (100 mm. x 65 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 43. Mathews, Birds of Australia, Vol. II., pl. 96.

The Black-browed Albatross (or Mollyhawk) is frequently to be seen around the Tasmanian coasts. In such localities as Storm Bay individuals of this species may usually be seen. It was common in Wineglass (or Thoun) Bay during the 1914 Easter Camp of the Tasmanian Field Naturalists' Club at that locality.

### GREY-HEADED ALBATROSS (Flat-billed Albatross).

*Diomedea chrysostoma*, Forster.

*Diomedea chrysostoma*, Mem. Math. Phys. (1875), X., p. 571.

Range—Southern oceans.

Tasmanian form—*Diomedea chrostoma culminata*, Gould, P.Z.S. (1843), p. 107

Head and neck greyish. Upper surface brownish black. Under white. Bill black, yellow stripe. Legs and feet yellow.

Dimensions—Length, 915 mm. Bill, 120 mm. Wing, 515 mm. Tail, 200 mm. Tarsus, 85 mm.

References—Gould, Birds of Australia, Vol. VII., pl. 41. Mathews, Birds of Australia, Vol. II., pl. 97.

Gould's type of *D. culminata* is in the Gould collection at Philadelphia (Alexander, Emu, XX., p. 225). This species is often referred to in the vernacular as the "Grey-headed Mollymawk."

### YELLOW-NOSED ALBATROSS.

*Diomedea chlororhynchus*, Gmelin.

*Diomedea chlororhynchus*, Gmelin, Syst. Nat. (1789), I., p. 563.

Range—Southern oceans.

Tasmanian form—*Diomedea chlororhynchus bassi*. *Diomedea bassi*, Mathews, Nov. Zool. (1912), XVIII., p. 216.

Head and neck whitish grey. Upper sooty brown. Under white. Bill blackish, yellow culmen. Legs and feet pinkish.

Dimensions—Length, 800 mm. Bill, 110 mm. Wing, 450 mm. Tail, 170 mm. Tarsus, 75 mm.

References—Gould, Birds of Australia, Vol. VII., pl. 42. Mathews, Birds of Australia, Vol. II., pl. 98.

This species can be seen on the East Coast of Tasmania, and Hull states (Emu, XV., p. 215) that it is by far the commonest form on the New South Welch coasts.

## SOOTY ALBATROSS.

*Phæbetria fusca*, Hils.

("Diomedea fusca, Hilsenberg, in Froese's Notizen, Vol. III., No. 5 (49), p. 74, 1822.")—Mathews.

Tasmanian form—*Phæbetria fusca campbelli*. Mathews, Birds of Australia (1912), II., p. 304.

Colour above and below sooty brown. Head and wings darker. Bill black. Legs and feet pinkish.

Dimensions—Length, 850 mm. Bill, 115 mm. Wing, 515 mm. Tail, 240 mm. Tarsus, 77 mm.

References—Gould, Birds of Australia, Vol. VII., pl. 44. Mathews, Birds of Australia, Vol. II., p. 304.

The Sooty Albatross is to be met with in Bass Straits and around the Tasmanian coasts. Gould secured specimens of this species, one skin of which is in his collection preserved in Philadelphia.

## GREY-MANTLED ALBATROSS.

*Phæbetria palpebrata*, Forster.

*Diomedea palpebrata*, Forster, Mem. Math. Phys. (1785), X., p. 572.

Range—Southern oceans.

Tasmanian form—*Phæbetria palpebrata huttoni*, Mathews, Birds of Australia, Vol. II., p. 297.

Head and throat sooty black. Above grey. Under brownish-grey. Bill black. Tarsi and feet pinkish.

Dimensions—Length, 820 mm. Bill, 115 mm. Wing, 525 mm. Tail, 235 mm. Tarsus, 80 mm.

Nest and Eggs—Nest in crevice in rocks. Egg (1) whitish, spotted pink (100 mm. x 60 mm.).

References—Mathews, Birds of Australia, Vol. II., pl. 101. Alexander, Emu, Vol. XX., p. 72.

According to Alexander this species is less common in Australian seas than the Sooty Albatross.

There are no authentic records of its occurrence in Tasmanian waters, but as it occurs in the Bight it would undoubtedly be found on some occasions in the Tasmanian region. We include the description in the hope that it may assist the identification of a Tasmanian species in the future.

ORDER *PELECANIFORMES* (Pelican-like Birds).

The members of this order have their feet entirely webbed and hind toe united.

Included in the order are Cormorants, Gannets and Pelicans. The Pelicans are now to be seen only on the less frequented portions of the coasts and amidst certain of the Bass Straits islands. In the early days they were plentiful, and many of the early explorers have left records relating to this species. The Gannets are common, and can be seen in most places along the coasts and in the estuaries of the larger rivers. The Cormorants are well distributed throughout the island, and such species as the Large Black Cormorant can be seen from the sea shore to the mountain lakes. In certain years there are regular invasions of cormorants, which apparently come over from the mainland.

## BLACK CORMORANT.

*Phalacrocorax carbo*, Linnæus.

*Pelecanus carbo*, Linn., Syst. Nat. (1858), p. 133.

Range—Tasmania, Australia, New Zealand, &c. Practically cosmopolitan.

Tasmanian form—*Phalacrocorax carbo novæ-hollandiæ*, Stephens, Shaw's Nat. Mus. (1826), XIII., p. 93.

General colour greenish black. Side of face and upper throat white. White patch on side. Naked skin round eye, yellow. Bill yellowish. Tarsi and feet black.

Dimensions—Length, 900 mm. Bill, 66 mm. Wing, 350 mm. Tail, 160 mm. Tarsus, 58 mm.

Nest and Eggs—Nest in trees or on rocks. Eggs (2-4) greenish, lime coated (59 mm. x 36 mm.). Nests August to December.

References—Gould, Birds of Australia, Volume VII., pl. 66. Mathews, Birds of Australia, Volume IV., pl. 219.

The Black Cormorant, or "Shag," as he is commonly called, is perhaps the most widely distributed of the Tasmanian avifauna. This species may be noted away out at sea or along the coasts, in the inland rivers, and away up on the mountain lakes of the highlands 4000 feet above sea level. It is the main enemy of the imported fish placed in the inland streams, and whilst the Black and White Cormorant has some redeeming features, it is difficult to find the same in the large black variety.

These birds occasionally nest on the coast or islands, but more often in the inland rivers and lakes.

## LITTLE BLACK CORMORANT.

*Phalacrocorax ater*, Lesson.

*Carbo ater*, Lesson, Traite d'Orn. (1831), p. 604.

Range—Tasmania, Australia, N.Z., N.G., Java, &c.

Entire plumage black. Light patch on neck. Naked skin round eye slaty grey. Bill, tarsi and feet black.

Dimensions—Length, 630 mm. Bill, 47 mm. Wing, 255 mm. Tail, 125 mm. Tarsus, 46 mm.

Nest and Eggs—Nests in trees or on rocks. Eggs (2-4) greenish, lime coated. Nests August to November.

References—Gould, Birds of Australia, Volume VII., pl. 67. Mathews, Birds of Australia, Volume IV., pl. 220.

The Little Black Cormorant may be seen in many of our rivers, but is not as plentiful as the larger species. It appears to keep more to the rivers, and does not frequent the inland lakes, as the Black Cormorant does. As with the larger species, the Little Black Cormorant prefers inland waters for its rookeries, the nests usually being built in the trees overhanging the water.

## WHITE-BREASTED CORMORANT.

*Phalacrocorax fuscescens*, Vieillot.

*Hydrocorax fuscescens*, Vieillot, Nouv. Diet. d'Hist. Nat. (1817), VIII., p. 86.

Range—Tasmania and Australia.

Above glossy black. Under silver white. Naked skin round eye purplish. Bill blackish. Tarsi and feet black.

Dimensions—Length, 725 mm. Bill, 69 mm. Wing, 320 mm. Tail, 130 mm. Tarsus, 63 mm.

Nest and Eggs—Nest on rocks. Eggs (2-3) greenish, lime coated (59 mm. x 36 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume VII., pl. 69. Mathews, Birds of Australia, Volume IV., pl. 221.

The White-breasted Cormorant is one of the commonest birds around the coasts and along the estuaries of the rivers. It also travels inland, but not to the same extent as the Black Cormorant. There is a large rookery of this species near Cape Frederick Henry (Bruny Island), close to the mouth of the River Derwent. It prefers the rocky ledges of the sea coast for its rookeries.

## PIED CORMORANT.

*Phalacrocorax varius*, Bon.

*Hypoleucus varius*, Bonaparte, Gen. Av. (1856), II., p. 173.

Range—Tasmania, Australia, and N.Z.

Above glossy black. Under silvery white. Bare orange coloured patch in front of eye. Indigo ring around eye. Bill bluish white. Tarsi and feet black.

Dimensions—Length, 700 mm. Bill, 70 mm. Wing, 324 mm. Tail, 140 mm. Tarsus, 66 mm.

Nest and Eggs—Nests on rocks or in trees. Eggs (2-3) lime coated. Nests August to November.

References—Gould, Birds of Australia, Volume VII., pl. 68. Mathews, Birds of Australia, Volume IV., p. 222.

## LITTLE CORMORANT.

*Microcarbo melanoleucus*, Vieillot.*Hydrocorax melanoleucos*, Vieillot, Nouv. Dict. d'Hist. Nat. (1817), VIII., p. 88.

Range—Tasmania, Australia, N.Z., and parts of Pacific.

Above glossy black. Under silvery white. Bare skin round eye yellowish. Bill yellow, black culmen. Tarsi and feet black.

Dimensions—Length, 600 mm. Bill, 30 mm. Wing, 235 mm. Tail, 155 mm. Tarsus, 37 mm.

Nest and Eggs—Nest of sticks, in trees. Eggs (3-4) lime coated (46 mm. x 30 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume VII., pl. 70. Mathews, Birds of Australia, Volume IV., pl. 223.

The Little Cormorant is not nearly as plentiful as the larger white-breasted species, but is perhaps more plentiful than the Little Black Cormorant.

## GANNET.

*Sula serrator*, Gray.*Sula serrator*, Gray, Voy. Er. & Terr. Birds (1845), p. 19.

Range—Tasmania and Australasia.

Head and neck yellowish buff. Centre tail feathers and band on wing brownish black. Bill bluish. Tarsi and feet greenish.

Dimensions—Length, 950 mm. Bill, 90 mm. Wing, 467 mm. Tail, 245 mm. Tarsus, 57 mm.

Nest and Eggs—Nest on ground. Egg (1) white (80 mm. x 50 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume VII., pl. 76. Mathews, Birds of Australia, Volume IV., pl. 226.

The Gannet, or "Diver," as he is often called in Tasmania, is fairly plentiful around the coasts of Tasmania and in the estuaries of the larger rivers, where, on occasions, they may be seen in large numbers performing their wonderful diving feats in order to obtain their food.

There are several rookeries around the Tasmanian coasts, the most famous of which is on Cat Island, in Bass Strait. They also nest on Pedra Branca, an isolated rock off the South Coast of Tasmania.

## AUSTRALIAN PELICAN.

*Pelecanus conspicillatus*, Temminck.*Pelecanus conspicillatus*, Temminck (1824).

Range—Tasmania and Australasia.

General plumage white. Wings and tail black. Bill pinkish, pouch yellow. Legs yellowish. Feet grey.

Dimensions—Length, 1600 mm. Bill, 450 mm. Wing, 640 mm. Tail, 175 mm. Tarsus, 128 mm.

Nest and Eggs—Nest on ground. Eggs (2-3) white (95 mm. x 57 mm.). Nests September to November.

References—Gould, Birds of Australia, Volume VII., pl. 74. Mathews, Birds of Australia, Volume IV., pl. 233.

The Pelican is still to be seen at certain localities on the East Coast, and also among the islands in Bass Straits. We recently observed several at Flinders Island quietly feeding along the flats near the shore, and they may occasionally be seen in Blackman's Bay, near "The Narrows."

On the less frequented portions of the West Coast, such as Port Davey, Pelicans may still be seen in fairly large numbers. They may be identified easily by their enormous bill.

## ORDER LARIFORMES (Gull-like Birds).

The above order is composed of birds which frequent the sea. All the members of the order have webbed feet, and the bills differ in a marked manner from the Petrels. Although the members of this order are usually considered as closely approaching the *Tubinares*, the resemblance, when subject to biological examination, is found to be superficial only. In fact the *Lariformes* are more closely related to the Waders (*Charadriiformes*) than they are to the Petrels.

### GULL-BILLED TERN.

*Gelochelidon nilotica*, Gmelin.

*Gelochelidon nilotica*, Gmelin, Syst. Nat., Vol. I., pt., p. 606 (1789).

Range—Tasmania and cosmopolitan.

Tasmanian form—*Gelochelidon nilotica macrotarsa*, Gould.

General colour greyish white. Crown of head black. Wings grey on upper surface. Entire under surface white. Bill, legs and feet black. In winter the head is white, streaked black.

Dimensions—Length, 430 mm. Bill, 45 mm. Wing, 350 mm. Tail, 150 mm. Tarsus, 40 mm.

Nest and Eggs—Nest on ground, near water. Eggs (2-4) pale buff, marked purple and brown (53 mm. x 37 mm.).

References—Gould, Birds of Australia Supplement, pl. 87. Mathews, Birds of Australia, Vol. II., pl. 104.

The Gull-billed or Long-legged Tern can be identified by the comparatively long Gull-like bill and the exceptional length of the tarsi.

### CASPIAN TERN.

*Hydroprogne caspia*, Pallas.

*Sterna caspia*, Pallas, Nov. Comm. Ac. Sci., Petrop (1770), XIV., p. 582.

Range—Tasmania, and practically cosmopolitan.

Tasmanian form—*Hydroprogne caspia strenua*, Gould, Birds of Australia (1846), VIII., pl. 22.

Upper pale grey. Under white. Head black in breeding plumage. Bill orange. Legs and feet black.

Dimensions—Length, 525 mm. Bill, 78 mm. Wing, 440 mm. Tail, 155 mm. Tarsus, 45 mm.

Nest and Eggs—Nest on ground, in herbage. Eggs (2) pale buff, spotted brown and purple (60 mm. x 42 mm.). Nests October to January.

References—Gould, Birds of Australia, Volume VII., pl. 22. Mathews, Birds of Australia, Volume II., pl. 105.

The Caspian Tern is usually to be seen in most places around the coasts of Tasmania and amidst the bays and estuaries of the larger rivers.

### CRESTED (BASS STRAITS) TERN.

*Sterna bergi*, Lich.

*Sterna bergii*, Lichtenstein, Ver. Zool. Berl. Mus. (1823), p. 80.

Range—Tasmania, and practically cosmopolitan.

Tasmanian form—*Sterna bergii poliocerus*, Gould.

Upper grey. Under and neck white. Head black in breeding plumage. Bill yellow. Feet black.

Dimensions—Length, 455 mm. Bill, 60 mm. Wing, 335 mm. Tail, 160 mm. Tarsus, 30 mm.

Nest and Eggs—Nest on ground. Eggs (1-2) pale buff, marked purple (60 mm. x 40 mm.). Nests October to December.

References—Gould, Birds of Australia, Vol. VII., pl. 23. Mathews, Birds of Australia, Vol. II., pl. 106.

The Crested Tern ranges from the seas of Australia to Japan, through the Indian Ocean and the Red Sea, and around the coasts of South Africa. There are numerous sub-species, no less than eleven being given by one authority.

As far as Tasmania is concerned this species is fairly plentiful in certain localities. Numbers may often be seen in the estuaries of the Derwent.

### WHITE-FRONTED TERN.

*Sterna striata*, Gmelin.

*Sterna striata*, Gmelin, Syst. Nat. (1789), I., p. 609.

Range—Seas of Tasmania and Australasia.

Tasmanian form—*Sterna striata melanohyncha*, Gould, Birds of Australia (1848), Vol. VII., pl. 26.

Upper grey. Under white. Head black in breeding season. Bill black. Legs and feet brownish red.

Dimensions—Length, 430 mm. Bill, 45 mm. Wing, 280 mm. Tail, 183 mm. Tarsus, 21 mm.

Nest and Eggs—Nest on ground. Eggs (2) pale buff, spotted brown (47 mm. x 33 mm.). Nests November and December.

References—Gould, Birds of Australia, Vol. VII., pl. 26. Mathews, Birds of Australia, Vol. II., pl. 109.

The White-fronted Tern breeds on certain islands off the coast of Tasmania, and is fairly plentiful in certain localities.



## SOOTY TERN.

*Sterna fuscata*, Linn.*Sterna fuscata*, Linn., Syst. Nat. (1766), p. 228.

Range—Seas of Tasmania, Australia, and throughout intertropical seas.

Above sooty brown. Front of head, neck, and under surface white. Bill, legs and feet black.

Dimensions—Length, 450 mm. Bill, 50 mm. Wing, 300 mm. Tail, 200 mm. Tarsus, 24 mm.

Nest and Eggs—Nest on ground. Egg (1) pale buff, spotted brown (53 mm. x 35 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 32. Mathews, Birds of Australia, Vol. II., pl. 113.

The Sooty Tern is more plentiful in the tropical seas than around the coasts of Tasmania, but, as with many of the other ocean stragglers, an occasional bird or so wanders South.

## WHITE-FACED TERN.

*Sterna nereis*, Gould.*Sternula nereis*, Gould, P.Z.S. (1842), X., p. 140.

Range—Seas of Tasmania and Australasia.

Upper ash grey. Under and tail white. Back of head and neck black. Bill, legs and feet bright yellow.

Dimensions—Length, 250 mm. Bill, 35 mm. Wing, 185 mm. Tail, 90 mm. Tarsus, 17 mm.

Nest and Eggs—Nests on sand. Eggs (2) pale buff, spotted brown (35 mm. x 25 mm.). Nests November to December.

References—Gould, Birds of Australia, Vol. VII., pl. 29. Mathews, Birds of Australia, Vol. II., pl. 112.

The Little, or Fairy Tern, as the White-faced Tern is often called, is an active bird, and its rapid actions when diving into the waves in search of its food are a joy to watch.

## SILVER GULL.

*Larus novæ-hollandiæ*, Stevens.*Larus novæ-hollandiæ*, Stevens, Shaw Gen. Zool. (1826), XIII., p. 196.

Range—Seas of Tasmania, Australasia, and to the North.

Tasmanian form—*Larus nova-hollandiæ jamesonii*, Wilson.

Head and under surface white. Upper grey. Wing grey, tipped black. Bill and feet red.

Dimensions—Length, 425 mm. Bill, 35 mm. Wing, 305 mm. Tail, 125 mm. Tarsus, 50 mm.

Nests and Eggs—Nests amid rocks or herbage. Eggs (2-3) marked brown (53 mm. x 40 mm.). Nests October and November.

References—Gould, Birds of Australia, Vol. VII, pl. 20. Mathews, Birds of Australia, Vol. II., pl. 120.

The Silver Gull is to be met with everywhere around the coasts of Tasmania, near the city wharves, and on certain of the larger inland lakes. The Tasmanian form differs from the typical race by having large white markings on the primaries.

## PACIFIC GULL.

*Gabianus pacificus*, Latham.

*Larus pacificus*, Latham, Index Orn. Suppl. (1801), p. 68.

Range—Seas of Tasmania and Australia.

Head and under surface white. Upper black. Tail white, banded black (immature plumage brown, splashed white). Bill yellow, tipped red. Legs and feet yellow.

Dimensions—Length, 575 mm. Bill, 55 mm. Wing, 420 mm. Tail, 190 mm. Tarsus, 65 mm.

Nest and Eggs—Nest of grass. Eggs (2-3) stone colour, blotched brown and purple. Nests November to December.

Reference—Gould, Birds of Australia, Vol. VII., pl. 19. Mathews, Birds of Australia, Vol. II., pl. 121.

The Pacific Gull, whilst not as numerous as the Silver Gull, is common around the coasts of Tasmania, and in the larger rivers. The young birds are brown, and three seasons elapse before the bird obtains the black and white plumage of the adult.

## SOUTHERN SKUA.

*Catharacta lombergi*, Gould.

Range—Seas of Tasmania and Australia, and Southern oceans.

General colour brown. Distinctive white mark on wing and under eye. (Also lighter phase.) Bill and feet black.

Dimensions—Length, 650 mm. Bill, 55 mm. Wing, 430 mm. Tail, 170 mm. Tarsus, 80 mm. Female slightly smaller.

Nest and Eggs—Breeds Antarctic. Nest on ground. Eggs (2) stone colour, blotched brown (77 mm. x 53 mm.).

References—Gould, Birds of Australia, Vol. VII., pl. 21. Mathews, Birds of Australia, Vol. II., pl. 122.

The Skua, or Robber Gull, is well described by the latter designation. These birds live by attacking other sea birds, and making them disgorge their food, which the Skuas instantly seize. They will even attack Albatrosses.

Clive L. Paulson



White-necked Heron (*Nalaephona porphyrio*)  
Tennessee Museum

## ARCTIC (RICHARDSON) SKUA.

*Stercorarius parasiticus*, Linneaus.*Larus parasiticus*, Linn. Syst. Nat., 10th Ed. (1758), p. 136.

Range—Seas of Tasmania and Antaretic, ranging to the Arctic to breed.

Tasmanian form—*Stercorarius parasiticus viciatori*, Mathews. Aust. Av. Rec., Vol. II., p. 126.

General colour sooty brown. (Also light phase.) Bill and feet black.

Dimensions—Length, 450 mm. Bill, 33 mm. Wing, 320 mm. Tail, 175 mm. Tarsus, 45 mm.

Nest and Eggs—Nest of grass. Eggs (2) brown, mottled (58 mm. x 40 mm.).

Reference—Mathews, Birds of Australia, Vol. II., pl. 124.

A specimen of this species secured on the River Derwent in February was coloured as follows:—Upper sooty brown, neck and base of tail mottled, under surface paler, dirty greyish white, with darker markings, on breast.

## ORDER CHARADRIIFORMES (Wading Birds).

The Wading Birds constitute an interesting section of the Tasmanian avi-fauna, and yet a difficult one to study in detail, because several of the species are rare migratory forms.

## TURNSTONE.

*Arenaria interpres*, Linn.*Tringa interpres*, Linn. Syst. Nat. (1758), p. 148.

Range—Tasmania, and practically cosmopolitan.

Tasmanian form—*Arenaria interpres oahuensis*, Bloxham.

Upper dark brown, chest brown. Throat and under white. Bill (short) black. Legs and feet reddish brown.

Dimensions—Length, 217 mm. Bill, 23 mm. Wing, 156 mm. Tail, 60 mm. Tarsus, 24 mm.

Nest and Eggs—Nests on ground. Eggs (4) pale green, brown markings. Breeds Northern Asia.

References—Gould, Birds of Australia, Volume VII., pl. 39. Mathews, Birds of Australia, Volume III., pl. 125.

The Turnstone is a migratory species, which is not very common in Tasmania. It is seen only in the Australian zone in its winter plumage of mottled brown, and when it goes north to breed it changes to a gayer colouration.

## PIED OYSTER CATCHER.

*Hæmatopus ostralegus*, Linn.*Hæmatopus ostralegus*, Linn. Syst. Nat. (1758), p. 152.

Range—Tasmania, Australia, North through Asia to Europe.

Tasmanian form—*Hæmatopus ostralegus longirostris*, Vieillot, Nov. Diet. d'Hist. Nat. (1817), XV., 410.

Head, back, wings, and tail black. Upper tail coverts and under surface white. Bill, legs, and feet bright red.

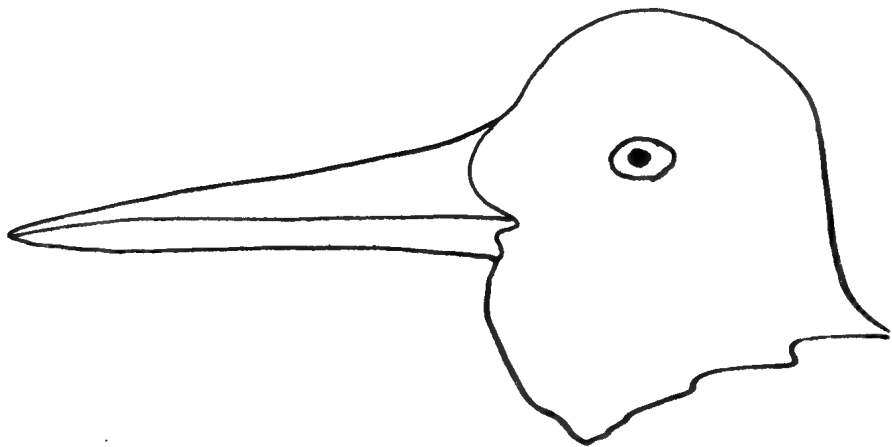
Dimensions—Length, 500 mm. Bill, 80 mm. Wing, 280 mm. Tail, 110 mm. Tarsus, 57 mm. Female slightly larger.

Nest and Eggs—Eggs (2) sand colour, with brown and purple markings (63 mm. x 42 mm.). Nests October to December.

References—Gould, Birds of Australia, Vol. VI., pl. 7. Mathews, Birds of Australia, Vol. III., pl. 126.

The Pied Oyster Catcher is a common bird around the shores of Tasmania, and also among the Bass Straits islands. In this latter locality we recently counted twenty-three in one flock. As with other birds of this class, the eggs are laid in a slight depression in the sand, and so well do they resemble their surroundings that it needs an experienced eye to find them, even when the locality of the "nest" is known.

## BLACK OYSTER CATCHER.

*Hæmatopus unicolor*, Forster.

## Black Oyster Catcher (Continued)

*Hamatopus unicolor*, Forster, Des Anam. (1844), p. 112.

Range—Tasmania and Australasia.

Tasmanian form—*Hamatopus unicolor fuliginosus*, Gould, Birds of Australia (1845), Vol. IV., pl. 8.

Entire plumage sooty black. Bill, legs and feet bright red.

Dimensions—Length, 500 mm. Bill, 80 mm. Wing, 290 mm. Tail, 125 mm. Tarsus, 50 mm. Female larger.

Nest and Eggs—Nest a hollow, usually amid rocks at end of sandy beach. Eggs (2-3) sand colour, with purple and brown markings (65 mm. x 44 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 8. Mathews, Birds of Australia, Volume III., pl. 127.

The Black or Sooty Oyster Catcher is also known as the Red-bill, on account of its bright red bill, which shows out in such marked contrast to the sooty black of its general plumage. Whilst this species is as evenly distributed, it cannot be considered as plentiful as the Pied form.

## BANDED (BLACK-BREASTED) PLOVER.

*Zonifer tricolor*, Vieillot.

*Charadrius tricolor*, Nouv. Dict. d'Hist. Nat. (1918), XXVII., p. 117.

Range—Tasmania and Australia.

General colour, above brown. Head black. White streak behind eye. Tail white, banded black. Under white, black band across chest. Bill yellow. Tibia red. Tarsi and feet black.

Dimensions—Length, 286 mm. Bill, 24 mm. Wing, 203 mm. Tail, 92 mm. Tarsus, 50 mm.

Nest and Eggs—Nest on ground. Eggs (4) ground colour, purple markings (45 mm. x 31 mm.). Nests September to December.

References—Gould, Birds of Australia, Vol. VI., pl. 11. Mathews, Birds of Australia, Vol. III., pl. 131.

The Banded or Black-breasted Plover is a well-known bird in Tasmania. Flocks may be seen along the sea shore or away in the inland district.

## GREY PLOVER.

*Squatarola squatarola*, Linn.

*Tringa squatarola*, Linn. Syst. Nat. (1758), p. 149.

Range—Tasmania and Australia, migrating to North to breed.

Tasmanian form—*Squatarola squatarola hypomelas*, Pallas.

General colour brownish grey, splashed black and white. Under paler. Outer primaries black. Bill and feet black.

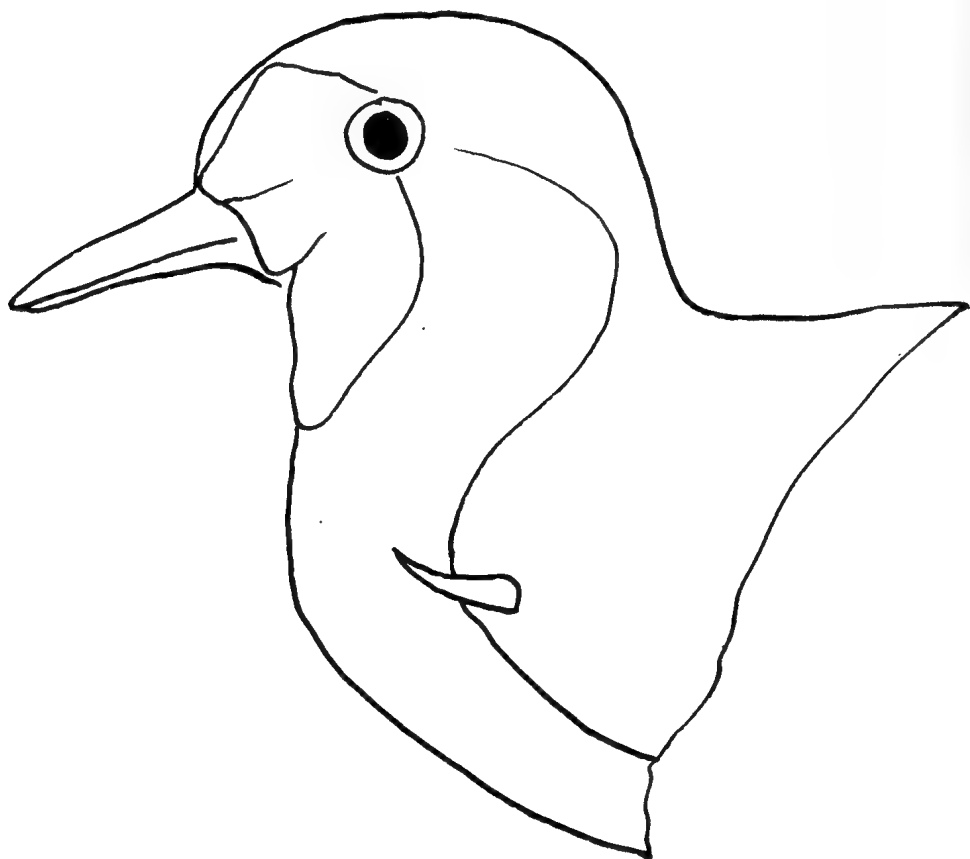
Dimensions—Length, 275 mm. Bill, 32 mm. Wing, 200 mm. Tail, 75 mm. Tarsus, 47 mm.

Nest and Eggs—Nest on ground. Eggs (4) ground colour, spotted brown (50 mm. x 36 mm.). Breeds Siberia.

References—Gould, Birds of Australia, Volume VI., pl. 12. Mathews, Birds of Australia, Vol. III., pl. 132.

The Grey Plover is one of the summer migrants, and may then be seen occasionally in suitable localities in Tasmania.

## SPUR-WINGED PLOVER.

*Lobibyx novæ-hollandiæ*, Stephens

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Lobibyx novæ-hollandiæ novæ-hollandiæ*, Stevens.

Back of head black. Back brown. Wings and tail edged black. Run up and under white. Spur on shoulder. Yellow wattles. Bill yellow. Legs and feet reddish.

Dimensions—Length, 370 mm. Bill, 34 mm. Wing, 245 mm. Tail, 105 mm. Tarsus, 75 mm.

Nest and Eggs—Nest on ground. Eggs (4) brownish green, shaded olive (52 mm. x 36 mm.). Nests August to December.

References—Gould, Birds of Australia, Vol. VI., pl. 9. Mathews, Birds of Australia, Vol. III., pl. 129.

The Spur-winged Plover is evenly distributed throughout Tasmania, but it is not as numerous as the Black-breasted species, which prefers drier country than that



favoured by the Spur-wing. Plovers are of great economic value, as they destroy great numbers of land snails, and these latter are necessary for the development of the sheep fluke, as in a certain stage of its life's history the snail is essential for its development. The destruction of these land snails is therefore tending to lessen the spread of fluke.

### LESSER GOLDEN PLOVER.

*Pluvialis dominicus*, Muller.

*Charadrius dominicus*, Muller, Vollst. Nat. Supp. (1776), p. 116.

Range—Tasmania, Australia, migrating North to breed. Practically cosmopolitan.

Tasmanian form *Pluvialis dominicus fulva*, Gmelin.

General colour brown. Back mottled black and gold. Under paler. Bill black. Legs and feet greyish.

Dimensions—Length, 250 mm. Bill 23 mm. Wing, 170 mm. Tail, 60 mm. Tarsus, 40 mm.

Nest and Eggs—Nest on ground. Eggs (4) ground colour, spotted purple (48 mm. x 33 mm.). Breeds in Northern Hemisphere.

References—Gould, Birds of Australia, Volume VI., pl. 13. Mathews, Birds of Australia, Volume III., pl. 133.

The Lesser Golden Plover is another of the Northern migrants which visits Tasmania in small numbers during the summer season of our year.

### DOUBLE-BANDED DOTTREL.

*Charadrius bicinctus*, Jardine & Selby.

*Charadrius bicinctus*, Jard. & Selb. Ill. Orn. (1827), Vol. I., pl. 28.

Range—Tasmania and Australasia.

Above brown. White above eye. Under white, with two distinctive bars across chest, one black, second brown. Bill, legs, and feet blackish.

Dimensions—Length, 190 mm. Bill, 20 mm. Wing, 125 mm. Tail, 55 mm. Tarsus, 30 mm.

Nest and Eggs—Nest in a hollow, in sand. Eggs (2-3) sand coloured, spotted brown (35 mm. x 25 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 16. Mathews, Birds of Australia, Volume III., pl. 134.

The Double-banded Dottrel is not a very common bird in Tasmania. It breeds in New Zealand, but as far as we are aware this species has not been found breeding in Tasmania.

## RED-CAPPED DOTTREL.

*Charadrius ruficapillus*, Temminck.*Charadrius ruficapillus*, Temm. (1821), pl. 47, fig. 2.

Range—Tasmania and Australia (New Zealand accidental).

Above reddish brown. Top and head chestnut. Black streak from bill to eye. Front of head and under surface white. Bill, tarsi, and feet black.

Dimensions—Length, 160 mm. Bill, 15 mm. Wing, 105 mm. Tail, 40 mm. Tarsus, 25 mm.

Nest and Eggs—Nest a hollow in sand. Eggs (2) sand colour, marked brown, black and purple (30 mm. x 23 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume VI., pl. 17. Mathews, Birds of Australia, Volume III., pl. 138.

One does not need to travel far along any section of the Tasmanian coast where there are sandy beaches without seeing a certain number of Red-capped Dottrels.

## HOODED DOTTREL.

*Charadrius cucullatus*, Vieillot.*Charadrius cucullatus*, Vieillot, N. Diet. d'Hist. Nat. (1818), XXXVII., p. 136.

Range—Tasmania and Southern Australia.

Tasmanian form—*Charadrius cucullatus cucullatus*, Vieillot.

Head and throat black. Back of neck white. Back grey. Tail and wing marked with black. Under white. Bill yellow, tipped black. Legs and feet pinkish.

Dimensions—Length, 210 mm. Bill, 18 mm. Wing, 140 mm. Tail, 65 mm. Tarsus, 25 mm.

Nest and Eggs—Nest in hollow in sand. Eggs (2-3) sand colour, with purple and black markings (38 mm. x 26 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume VI., pl. 18. Mathews, Birds of Australia, Volume III., pl. 139.

The Hooded Dottrel may be seen on many of the coastal beaches in Tasmania.

## BLACK-FRONTED DOTTREL.

*Charadrius melanops*, Vieillot.*Charadrius melanops*, Vieillot, Nov. Diet. d'Hist. Nat. (1818), XXVII., p. 139.

Range—Tasmania and Australia.

Chest and forehead black. Throat and under surface white, white streak over eyes. Bill, legs, and feet yellowish.

Dimensions—Length, 168 mm. Bill, 15 mm. Wing, 107 mm. Tail, 55 mm. Tarsus, 25 mm.

Nest and Eggs—Nest a hollow in sand. Eggs (2-3) sand colour, with brown and umber markings (29 mm. x 21 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 20. Mathews, Birds of Australia, Volume III., pl. 140.

The Black-fronted Dottrel is rare in Tasmania.

## WHITE-HEADED STILT.

*Himantopus leucocephalus*, Gould.*Himantopus leucocephalus*, Gould, P.Z.S.

Range—Tasmania, Australasia, New Guinea, &amp;c.

Wings and back of neck black. Head and rest of body white. Bill black. Legs and feet red.

Dimensions—Length, 380 mm. Bill, 60 mm. Wing, 230 mm. Tail, 75 mm. Tarsus, 110 mm.

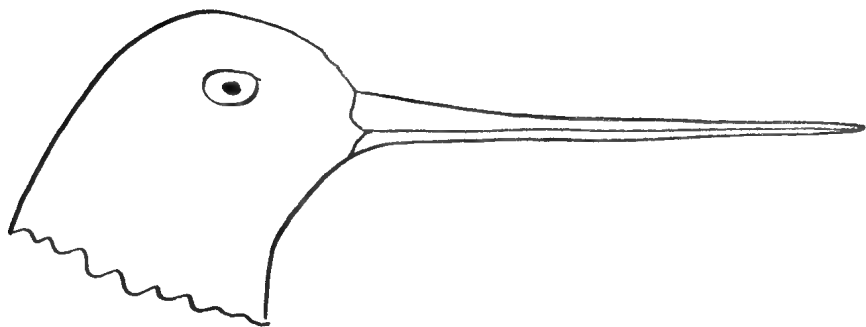
Nest and Eggs—Nest a hollow in ground. Eggs (4) ground colour, marked purple (44 mm. x 30 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 24. Mathews, Birds of Australia, Volume III., pl. 141.

The White-headed or Long-legged Stilt is to be seen occasionally on the swamps and lagoons.

Mathews and Iredale state (Man. Birds of Australia, Vol. I., p. 153, 1921) that this species is not found in Tasmania, but this is incorrect.

## BANDED STILT.

*Cladorhynchus leucocephalus*, Vieillot.*Recurvirostra leucocephala*, Vieillot, N. Diet. d'Hist. Nat. (1816), III., p. 103.

Range—Tasmania and Australia.

Head and neck white. Brown band across chest (sometimes absent). Wings and abdomen black. Remainder white. Bill (long) black. Legs and feet flesh colour.

Dimensions—Length, 410 mm. Bill, 70 mm. Wing, 195 mm. Tail, 85 mm. Tarsus, 83 mm.

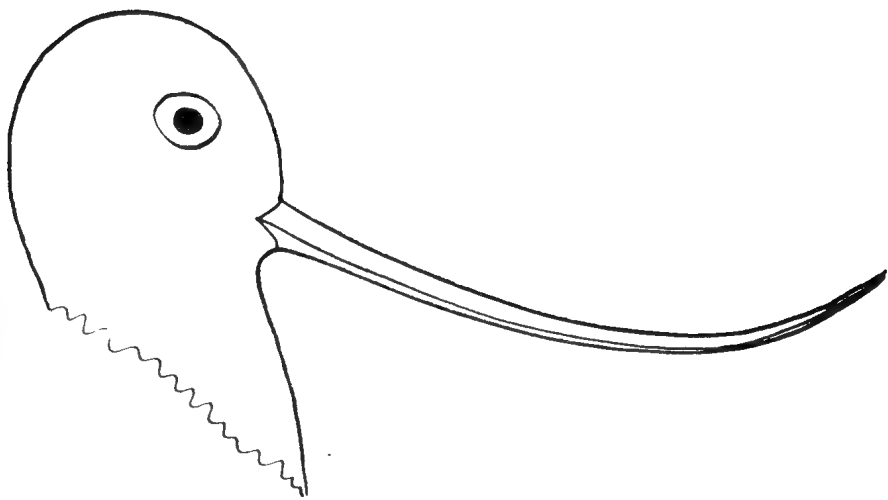
Nest and Eggs—Nest on ground. Eggs (4) ground colour, marked dark brown (45 mm. x 30 mm.).

References—Gould, Birds of Australia, Vol. VI., pl. 26. Mathews, Birds of Australia, Vol. III., pl. 142.

The Banded Stilt is another of the wading birds which appear in the Tasmanian swamps for a few months each summer. In August, 1921, a specimen of this species was received at the Tasmanian Museum, having been shot at Sandford. There was not the slightest trace of the usual brown band across the chest of this specimen.

### RED-NECKED AVOCET.

*Recurvirostra nova-hollandiae*, Vieillot.



*Recurvirostra nova-hollandiae*, Vieillot, N. Diet. d'Hist. Nat (1816), III., pl. 103.

Range—Tasmania, Australia, and New Zealand.

Head and neck reddish brown. Upper white, marked black. Wings black, with white markings. Under white. Bill (curved up) black. Legs and feet slaty.

Dimensions—Length, 450 mm. Bill, 85 mm. Wing, 220 mm. Tail, 85 mm. Tarsus, 95 mm.

Nest and Eggs—Nest on ground. Eggs (4) stone colour, marked brown (50 mm. x 33 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 27. Mathews, Birds of Australia, Volume III., pl. 143.

The Red-necked Avocet is but a rare visitor to the river estuaries and swamps of Tasmania. It can be identified immediately by the long black upcurved bill.

## AUSTRALIAN CURLEW.

*Numenius cyanopus*, Vieillot.*Numenius cyanopus*, Vieillot, N. Diet. d'Hist. Nat. (1817), VIII., p. 306.

Range—Tasmania and Australia, migrating North to Siberia and Japan.

General colour grey, with dark brown marking all over. Under surface paler. Bill brown, tip black. Legs and feet bluish.

Dimensions—Length, 600 mm. Bill, 180 mm. Wing, 310 mm. Tail, 115 mm. Tarsus, 90 mm.

Nest and Eggs—Breeds Siberia.

References, Gould, Birds of Australia, Volume VI., pl. 42. Mathews, Birds of Australia, Volume III., pl. 144.

The Curlew is to be seen along the sea beaches of the river estuaries, particularly in the North. This species must not be confused with the Stone Plover—a bird which is often called the Curlew by country dwellers.

## WHIMBREL.

*Numenius phaeopus*, Linnaeus.*Scolopax phaeopus*, Linn. Syst. Nat., 1758, p. 146.

Range—Tasmania, Australia, migrating North to Siberia.

Tasmanian form—*Numenius phaeopus variegatus*, Scopoli.

General colour brownish, flecked dark brown, with faint white markings. Under paler. Bill black. Legs and feet greenish grey.

Dimensions—Length, 400 mm. Bill, 70 mm. Wing, 225 mm. Tail, 90 mm. Tarsus, 55 mm.

Nest and Eggs—Breeds Siberia.

References—Gould, Birds of Australia, Volume VI., pl. 43. Mathews, Birds of Australia, Volume III., pl. 145.

The Whimbrel is another of the migratory waders which occasionally visit Tasmania. This species may be considered as rare, as far as this island is concerned.

## BARRED-TAILED GODWIT.

*Limosa lapponica*, Linnaeus.*Scopolax lapponica*, Linn. Syst. Nat. (1758), p. 147.

Range—Tasmania, Australasia, migrating to Siberia.

Tasmanian form—*Limosa lapponica baneri*, Maumann.

Head and neck pale grey brown. Upper grey brown, pale mottled markings. Tail barred brown and white. Under paler. Bill, legs and feet blackish.

Dimensions—Length, 375 mm. Bill, 85 mm. Wing, 225 mm. Tail, 75 mm. Tarsus, 55 mm.

Nest and Eggs—Breeds Siberia. Nest on ground. Eggs (4) ground colour, marked brown (57 mm. x 36 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 29. Mathews, Birds of Australia, Volume III., pl. 148.

The Barred-tailed Godwit is another of the Northern migratory birds which may be seen in the shallow of the estuaries of Tasmania during the summer months.

## SANDPIPER.

*Actitis hypoleucos*, Linnaeus.

*Tringa hypoleucos*, Linn. Syst. Nat. 1. p. 250.

Range—Tasmania, Australia, Africa, &c., migrating North.

Tasmanian form—*Actitis hypoleucos auritus*, Latham, Index Orni. Supp. (1801), p. XVI.

Upper surface dark brown. Throat greyish. White ring round eye. Under white.

Dimensions—Length, 210 mm. Bill, 27 mm. Wing, 110 mm. Tail, 55 mm. Tarsus, 25 mm.

Nest and Eggs—Breeds Siberia. Nest on ground. Eggs (4) greyish, marked brown (35 mm. x 25 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 35. Mathews, Birds of Australia, Volume III., pl. 153.

The Sandpiper is another representative of the Siberian wading birds which migrate every year to the South.

## GREENSHANK.

*Glottis nebularius*.

Range—Tasmania and Australia, migrating to the Northern Hemisphere.

Head greyish brown. Wings brown. Upper (except back of throat) greyish black. Neck and all under surface white. Tail barred brown. Legs greenish grey.

Dimensions—Length, 330 mm. Bill, 50 mm. Wing, 190 mm. Tail, 80 mm.

Nest and Eggs—Breeds Northern Hemisphere. Nest on ground. Eggs (4) grey buff, blotched red (50 mm. v 34 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 36. Mathews, Birds of Australia, Volume III., pl. 155.

The Greenshank is another of the more or less rare visitors which come to Tasmania for a few months each year. Among the beaches of the Northern rivers appears to be the favourite haunt of this species.

## LITTLE (RED-NECKED) STINT.

*Pisobia ruficollis*, Pallas.*Tyrnğa ruficollis*, Pallas, Russi. Russ. Reicho. (1776), III., p. 700.

Range—Tasmania, Australia, migrating to Siberia, &amp;c.

Head and neck chestnut (summer plumage). Upper grey, mottled black. Bill black.

Dimensions—Length, 150 mm. Bill, 17 mm. Wing, 100 mm. Tail, 42 mm. Tarsus, 20 mm.

Nest and Eggs—Breeds Siberia.

References—Gould, Birds of Australia, Volume VI., pl. 31. Mathews, Birds of Australia, Volume III., pl. 159-160.

The Little or Red-necked Stint may be seen occasionally in Tasmania during the summer months.

## SHARP-TAILED STINT.

*Pisobia acuminata*, Horsfield.*Totanus acuminatus*, Horsfield, Trans. Linn. Soc. (1821), p. 192.

Range—Tasmania, Australasia, &amp;c., migrating North.

Upper dark brown, mottled black, chestnut and white. Throat white. White streak around forehead and over eye. Chest pale brown. Breast white. Bill brown. Legs and feet olive green.

Dimensions—Length, 220 mm. Bill, 25 mm. Wing, 130 mm. Tail, 55 mm. Tarsus, 30 mm.

Nest and Eggs—Breeds Siberia.

References—Gould, Birds of Australia, Volume VI., pl. 30. Mathews, Birds of Australia, Volume III., pl. 161.

The Sharp-tailed or Marsh Stint is not as rare in Tasmania as are many of its fellow Siberian migrants. Along river flats and marshes small flocks of this species occasionally may be observed.

## CURLEW SANDPIPER.

*Erolia ferruginea*, Brunnich.

Range—Tasmania, Australia, migrating to Northern Hemisphere.

Top of head and upper surface brown grey. Tail coverts white. Tail greyish brown. Sides of head and under surface white. Dark brown streak under eye. Bill, legs, and feet black.

Dimensions—Length, 200 mm. Bill, 35 mm. Wing, 130 mm. Tail, 50 mm. Tarsus, 30 mm.

Nest and Eggs—Breeds Siberia. Nest on ground. Eggs (4) greyish, marked brown (36 mm. x 25 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 32. Mathews, Birds of Australia, Volume III., pl. 162.

The Curlew Sandpiper constitutes another species of the Northern waders which are to be seen occasionally around the swamps and river flats in Tasmania.

## AUSTRALIAN SNIPE.

*Gallinago hardwickii*, Gray.*Scolopax hardwickii*, Gray. Zool. Misc. (1831), p. 16.

Range—Tasmania, Australia, &amp;c., migrating North.

General colour mottled brown. Head striped with dark brown. Throat and sides of head greyish. Under pale brown and white. Bill black. Legs and feet brownish.

Dimensions—Length, 310 mm. Bill, 70 mm. Wing, 160 mm. Tail, 70 mm. Tarsus, 40 mm.

Nest and Eggs—Breeds Japan. Nest on ground. Eggs (3-4) stone colour, blotched purple (40 mm. x 30 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 40. Mathews, Birds of Australia, Volume III., pl. 166.

The Snipe is one of the best known of the Charadriiformes in Tasmania, and this is mainly on account of the esteem with which it is held by sportsmen. In certain areas in the Lake district small flocks of this species may be met with usually during the summer season, and it is occasionally to be seen in many other localities.

## AUSTRALIAN PAINTED SNIPE.

*Rostratula australis*, Gould.*Rhyuchau australis*, Gould, Syn., Birds Aust. IV., p. 6.

Range—Tasmania and Australia.

Head brown, white streak in centre. White ring round eye. Upper greenish grey. Wings greenish to grey, mottled black, gold and white. Breast white. Bill brown. Feet yellowish.

Dimensions—Length, 285 mm. Bill, 40 mm. Wing, 140 mm. Tail, 50 mm. Tarsus, 40 mm. Female larger.

Nest and Eggs—Nest on ground. Eggs (4) whitish, marked black (30 mm. x 27 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 41. Mathews, Birds of Australia, Volume III., pl. 168.

The Painted Snipe is a rare species as far as its occurrence in Tasmania is concerned.

## SOUTHERN STONE PLOVER.

*Burhinus magnirostris*, Latham.*Charadrius magnirostris*, Latham, Ind. Arn. Supp. (1801), p. LXVI.

Range—Tasmania and Australia.

General colour grey. Upper darker, mottled brown and black. White on wing. Throat white. Chest buff, streaked dark brown. Under greyish white. Bill black. Legs and feet brownish.



Dimensions—Length, 525 mm. Bill, 55 mm. Wing, 275 mm. Tail, 140 mm. Tarsus, 120 mm.

Nest and Eggs—Nest on ground. Eggs (2) pale buff, marked umber.

References—Gould, Birds of Australia, Volume VI., pl. 6. Mathews, Birds of Australia, Volume III., pl. 174.

The Stone Plover has been noted only occasionally in Tasmania. (See Papers and Proceedings Royal Society of Tasmania, 1895.)

## ORDER ARDEIFORMES (Heron-like Birds).

The members of this order have, as a rule, the usual Heron-like outline of form which serves to distinguish them almost at a glance from other orders. The best known member of the group in Tasmania is the White-fronted Heron—the so-called "Blue Crane" of the country dweller.

### STRAW-NECKED IBIS.

*Threskiornis spinicollis*, Jameson.

*Ibis spinicollis*, Jameson, Edin. N. Phil. Jrn. (1835), XIX., p. 213.

Range—Tasmania (accidental), Australia.

Head black. Upper dark greenish. Under white. Straw coloured plumes on neck. Bill (long), legs and feet brownish black.

Dimensions—Length, 800 mm. Bill, 185 mm. Wing, 385 mm. Tail, 137 mm. Tarsus, 90 mm.

Nest and Eggs—Nest in swamp. Eggs (3-4) white (65 mm. x 45 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 45. Mathews, Birds of Australia, Volume III., pl. 178.

The Straw-necked Ibis is but a very rare visitor to Tasmania. The straw-like appendages of the neck form an easy basis for identification.

### GLOSSY IBIS.

*Plegadis falcinellus*, Linnaeus.

*Tantalus falcinellus*, Linn. Syst. Nat. (1766), I., 24.

Range—Tasmania (accidental), Australia, and practically cosmopolitan.

Upper glossy chestnut. Tail green. Bill (long), legs and feet brownish.

Dimensions—Length, 510 mm. Bill, 110 mm. Wing, 275 mm. Tail, 90 mm. Tarsus, 90 mm. (Specimen from Hamilton, Tasmania.)

Nest and Eggs—Nest of sticks. Eggs (3-4) bluish green.

References—Gould, Birds of Australia, Volume VI., pl. 47. Mathews, Birds of Australia, Volume III., pl. 179.

The Glossy Ibis is no more common than the Straw-necked species, and both are but accidental visitors to the island.

## WHITE EGRET.

*Egretta alba*, Linnaeus.*Ardea alba*, Linn. Syst. Nat. (1758), I., p. 239.

Range—Tasmania, Australasia, north to Japan, &amp;c.

Tasmanian form—*Egretta alba symmatophora*, Gould, Birds of Australia (1846), Volume VI., pl. 56.

Entirely white. Neck very long. Bill yellow, tipped black.

Dimensions—Length, 700 mm. Bill, 105 mm. Wing, 330 mm. Tail, 140 mm. Tarsus, 140 mm.

Nest and Eggs—Nest of sticks. Eggs (3-4) bluish green (55 mm. x 40 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 56. Mathews, Birds of Australia, Volume III., pl. 187.

Occasionally this beautiful bird is to be seen on our lakes and rivers, but as soon as it appears the usual "pot hunter" takes a delight in killing it, although it is protected by law. In certain years, such as 1892 and 1919, large numbers of these birds visited Tasmania, and the Museums received mutilated corpses of this beautiful bird from all over the island.

## WHITE-FRONTED HERON.

*Notophox nova-hollandiae*, Latham.*Ardea nova-hollandiae*, Latham, Ind. Orn. (1790), II., p. 701.

Range—Tasmania, Australasia, &amp;c.

Throat, forehead, and cheeks white. Head and neck dark slate colour. Upper grey. Under lighter. Bill black. Legs and feet yellowish.

Dimensions—Length, 600 mm. Bill, 77 mm. Wing, 320 mm. Tail, 125 mm. Tarsus, 100 mm.

Nest and Eggs—Nest of sticks. Eggs (4-5) bluish green (48 mm. x 34 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume VI., pl. 53. Mathews, Birds of Australia, Volume III., pl. 188.

There are no true Cranes in Tasmania, but the White-fronted Heron is generally known in the country as the "Blue Crane." This species is distributed fairly evenly throughout the island in such localities as are suitable for its habits.

## WHITE-NECKED HERON.

*Notophox pacifica*, Latham.*Ardea pacifica*, Latham, Ind. Orn. Supp. (1801), p. LXX.

Range—Tasmania and Australia.

Neck and head white. Forehead spotted black. Upper greenish black, tinged maroon. Under blackish, streaked white. Bill black. Legs olive, and feet black.

Dimensions—Length, 750 mm. Bill, 70 mm. Wing, 400 mm. Tail, 150 mm. Tarsus, 125 mm.

Nest and Eggs—Nest of sticks. Eggs (4) pale green (55 mm. x 40 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume VI., pl. 52. Mathews, Birds of Australia, Volume III., pl. 189.

The White-necked or Pacific Heron is by no means common in Tasmania, except in those years when there is a particularly dry season on the mainland. In such seasons this species, in company with other shore and marsh birds, come across to Tasmania in large numbers.

### BLUE REEF HERON.

*Demicretta sacra*, Gmelin.

*Ardea sacra*, Gmelin, Syst. Nat. (1789), p. 640.

Range—Tasmania, Australasia, North to Asia.

General colour slaty grey. Narrow white streak on throat. Bill brown. Tarsi and feet greenish.

Dimensions—Length, 600 mm. Bill, 90 mm. Wing, 275 mm. Tail, 100 mm. Tarsus, 70 mm.

Nest and Eggs—Nest of sticks. Eggs (4-5) pale green (44 mm. x 33 mm.).

References—Gould, Birds of Australia, Volume VI., pl. 60. Mathews, Birds of Australia, Volume III., pl. 191.

The Blue Reef Heron, whose habitat ranges from the coasts of India to New Zealand, is not very common in Tasmania.

### NANKEEN NIGHT HERON.

*Nycticorax caledonicus*, Gmelin.

*Ardea caledonica*, Gmelin, Syst. Nat. (1789), p. 626.

Range—Tasmania, Australasia, northward.

Tasmanian form—*Nycticorax caledonicus australasie*, Vieillot.

Top of head black, with two long nuchal feathers. Above reddish chestnut. Under white, tinged reddish. Bill black, and feet yellow.

Dimensions—Length, 500 mm. Bill, 72 mm. Wing, 285 mm. Tail, 105 mm. Tarsus, 85 mm.

Nest and Eggs—Nest of sticks. Eggs (3-4) pale green (55 mm. x 36 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume VI., pl. 63. Mathews, Birds of Australia, Volume III., pl. 193.

The Nankeen Night Heron is by no means common in Tasmania. Occasionally it may be seen on the Derwent, and the last one of which we have any record was at Risdon a few months ago. During most of the day this species sleeps in the tall eucalyptus, and does its hunting amidst the swamps during the nocturnal hours.

## AUSTRALIAN BITTERN.

*Botaurus poiciloptilus*, Wagler.*Ardea poiciloptila*, Wagler, Syst. d. Ardea (1827), p. 185.**Range**—Tasmania, Australasia, northwards.**General colour brown.** Upper dark brown to black. Upper golden brown. Bill greenish brown. Tarsi and feet greenish.**Dimensions**—Length, 725 mm. Bill, 70 mm. Wing, 330 mm. Tail, 120 mm. Tarsus, 100 mm.**Nest and Eggs**—Nest of herbage, in reeds. Eggs (4-5) green-brown (50 mm. x 35 mm.).**References**—Gould, Birds of Australia, Volume VI., pl. 64. Mathews, Birds of Australia, Volume III., pl. 199.

The dull "booming" of the Bittern may be heard in many of the Tasmanian swamps, particularly at night, when other sounds have quietened. Its characteristic attitude of standing erect and silent when danger threatens, so that its protective colouration merges into the surrounding rushes, &c., is well known.

## ORDER ANSERIFORMES.

The members of this order are all swimming birds with webbed feet, broad bills, and other characteristics which suit the various species for their methods of aquatic or semi-aquatic life.

## CAPE BARREN GOOSE.

*Cereopsis nova-hollandiæ*, Latham.*Cereopsis nova-hollandiæ*, Latham, Index Orn. Supp. (1801), p. LXVII.**Range**—Tasmania and Southern Australia.**General colour** ashy grey, shaded brown on upper surface. Bill black. Legs reddish. Feet black.**Dimensions**—Length, 840 mm. Bill, 47 mm. Wing, 510 mm. Tail, 175 mm. Tarsus, 100 mm.**Nest and Eggs**—Nest on ground. Eggs (1-6) whitish, lime coated (92 mm. x 60 mm.). Nests July to December.**References**—Gould, Birds of Australia, Volume VII., pl. 1. Mathews, Birds of Australia, Volume IV., pl. 204.

The Cape Barren Goose is an inhabitant of the Straits. Within the vicinity of Cape Barren Island this species suffers considerably from the raids of the half-castes during the nesting season.

This bird's habit of killing the chickens and other small inhabitants of the farmyard prevent it being kept to any extent by settlers on the islands.

## PIED GOOSE.

*Anseranas semipalmata*, Latham.*Anas semipalmata*, Latham, Trans. Linn. Soc. (1798), IV., p. 103.

Range—Tasmania (accidental) and Australia.

Head, neck, back, wings, and thighs black. Part back and under surface white. Bill reddish. Tarsi and feet bright yellow.

Dimensions—Length, 890 mm. Bill, 85 mm. Wing, 460 mm. Tail, 200 mm. Tarsus, 100 mm.

Nest and Eggs—Nest of herbage, in swamp. Eggs (5-11) whitish (75 mm. x 55 mm.).

References—Gould, Birds of Australia, Volume VII., pl. 2. Mathews, Birds of Australia, Volume IV., pl. 201.

The Pied Goose is but an accidental visitor to Tasmania. (See Papers and Proceedings of the Royal Society of Tasmania, 1888.) Two were recently noted at Cressy.

## BLACK SWAN.

*Chenopsis atrata*, Latham.*Anas atrata*, Latham, Index Orn. (1790), II., p. 834.

Range—Tasmania and Australia.

Plumage black. Under paler. Portion of wing white. Bill red, white band near tip. Legs and feet grey.

Dimensions—Length, 1000 mm. Bill, 75 mm. Wing, 500 mm. Tail, 125 mm. Tarsus, 100 mm.

Nest and Eggs—Nest of herbage, in water. Eggs (4-6) whitish (107 mm. x 70 mm.). Nests August to December.

References—Gould, Birds of Australia, Volume VII., pl. 6. Mathews, Birds of Australia, Volume IV., pl. 200.

The Black Swan is a distinctive species, and is distributed evenly over the island. Around the coasts, in the larger rivers, and also in the inland lakes this bird may be seen. It travels long distances in search of food or in moving from one district to another, and on moonlight nights its loud trumpeting can be heard high overhead as a small flock flies with facile wing from one feeding place to another.

The River Derwent has recently been proclaimed a sanctuary for this species, and under the powers conferred upon him by the "Animals and Birds Protection Act," the Commissioner of Police when occasion requires details special officers to watch the large breeding grounds on the East Coast, and save the nests and eggs from being interfered with.

## MANED GOOSE (Wood Duck).

*Chenonetta jubata*, Latham.*Anas jubata*, Latham, Index. Orni. Supp. (1801), pl. LXIX.

Range—Tasmania and Australia.

Head brown. Upper grey. Wing barred white and green. Under grey, spotted brown and black. Bill, legs and feet brownish green.

Dimensions—Length, 500 mm. Bill, 30 mm. Wing, 275 mm. Tail, 95 mm. Tarsus, 45 mm.

Nest and Eggs—Nest in hole in tree. Eggs (6-12) white (57 mm. x 40 mm.). Nests August to December.

References—Gould, Birds of Australia, Volume VII., pl. 3. Mathews, Birds of Australia, Volume IV., pl. 205.

The Maned Goose or Wood Duck is a rare bird in Tasmania.

## PLUMED WHISTLING DUCK.

*Dendrocygna cytoni*, Eyton.*Leptotarsis cytoni*, Eyton, Mon. Anat. (1838), p. III.

Range—Tasmania and Australia.

Top of head and neck brown. Side of head grey. Throat white. Chest chestnut. Under white. Back grey, fringed pale brown. Distinctive buff plumes in flank. Bill pink, mottled brown. Legs pink.

Dimensions—Length, 450 mm. Bill, 45 mm. Wing, 230 mm. Tail, 60 mm. Tarsus, 50 mm.

Nest and Eggs—Nest on ground. Eggs (10-12) whitish (50 mm. x 35 mm.).

References—Gould, Birds of Australia, Volume VII., pl. 15. Mathews, Birds of Australia, Volume IV., pl. 207.

The Plumed Whistling Duck is but a casual visitor to the island State.

## MOUNTAIN DUCK.

*Tadorna tadornoides*, Jardine & Selby.*Anas tadornoides*, Jard. & Selb., Ill. Orni. (1828), II., pl. LXII.

Range—Tasmania and Australia.

Head glossy black. White ring round neck. Buff band round chest. General plumage mottled brown. Wing marked buff, green and white. Bill black. Tarsi and feet brownish.

Dimensions—Length, 700 mm. Bill, 47 mm. Wing, 385 mm. Tail, 135 mm. Tarsus, 65 mm.

Nest and Eggs—Nest in hollow tree or on ground. Eggs (8-14) white (70 mm. x 48 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume VII., pl. 7. Mathews, Birds of Australia, Volume IV., pl. 209.

The Mountain Duck or Chestnut Sheldrake, as it is sometimes called, is not very plentiful in Tasmania. It may be seen amidst the lakes of the central plateau, and occasionally among the isolated ponds and lagoons in the Midlands and East Coast.

### GREY DUCK ("Black Duck").

*Anas superciliosa*, Gmelin.

*Anas superciliosa*, Gmelin, Syst. Nat. (1789), p. 537.

Range—Australia and Tasmania.

Tasmanian form—*Anas superciliosa rogersi*, Mathews, Ansted. Av. Rec. (1912), I., p. 33.

General colour brown, edged buff. Top of head black. Sides buff, with dark streak across eye. Purplish bronze and green markings on wing. Bill black. Tarsi and feet brownish.

Dimensions—Length, 560 mm. Bill, 53 mm. Wing, 270 mm. Tarsi, 45 mm. Tail, 95 mm.

Nest and Eggs—Nest on ground or in hollow tree. Eggs (7-13) greenish white (56 mm. x 40 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume VII., pl. 9. Mathews, Birds of Australia, Volume IV., pl. 210.

The Black Duck is one of the commonest and most widely distributed of the Tasmanian *Anseriformes*. Numbers of these birds, in company with Teal, may be seen nearly always on the Derwent in the vicinity of Bridgewater. Along the coasts and on the highest mountain lakes and tarns this species is to be met with. Also known as the Wild Duck or Grey Duck. The latter designation is now the generally accepted vernacular designation.

### CHESTNUT-BREASTED TEAL.

*Virago castanea*, Eyton.

*Mareca castanea*, Eyton, Monogr. Aust. (1838), p. 119.

Range—Tasmania and Australia.

Head and neck green. Breast chestnut. Wing blackish, banded green. Bill bluish. Tarsi and feet black.

Dimensions—Length, 450 mm. Bill, 40 mm. Wing, 200 mm. Tail, 100 mm. Tarsus, 40 mm.

Nest and Eggs—Nest in hollow tree (occasionally on ground). Eggs (8-13) cream colour (50 mm. x 35 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume VII., pl. 2. Mathews, Birds of Australia, Volume IV., pl. 211.

The Chestnut-breasted or Green-headed Teal is a species concerning which there has been very considerable discussion through its confusion with the Grey Teal, owing to sex and age characteristics, etc. For details of most of the opinions see Mathews, Birds of Australia, Volume IV., p. 97 *et seq.*, and also Littler, Birds of Tasmania, p. 222.

## GREY TEAL.

*Virago gibberifrons*, Rams.*Anas gibberifrons*, Ramsay, Proc. Linn. Soc., N.S.W. (1877), p. 209.

Range—Tasmania and Australia.

Head brown. Throat whitish. Upper brown, edged buff. Under lighter. Green and white markings on wing. Bill brown. Tarsi and feet brown.

Dimensions—Length, 450 mm. Bill, 40 mm. Wing, 200 mm. Tail, 100 mm. Tarsus, 40 mm.

Nest and Eggs—Nest on ground or in hollow tree. Eggs (8-13) cream colour (50 mm. x 35 mm.). Nests September to December.

Reference—Mathews, Birds of Australia, Volume IV., pl. 212.

The Grey Teal is a common species, and is to be met with in many localities. On the rivers, etc., it can usually be seen in flocks, feeding in company with other allied species.

## BLUE-WINGED AUSTRALIAN SHOVELLER.

*Spatula rhynchotis*, Latham.*Anas rhynchotis*, Latham, Index Orn. Supp. (1801), p. LXX.

Range—Tasmania, Australia, and New Zealand.

Head brown. Whitish streak in front of eye. Breast chestnut. Wings marked blue, green and white. Tail black. Bill (spoon-shaped) black. Tarsi and feet yellow.

Dimensions—Length, 500 mm. Bill, 65 mm. Wing, 240 mm. Tail, 75 mm. Tarsus, 35 mm.

Nest and Eggs—Nest on ground. Eggs (7-9) cream colour (51 mm. x 37 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume VII., pl. 12. Mathews, Birds of Australia, Volume IV., pl. 213.

The Shoveller or "Blue Wing" is a widely distributed species, and is recognised easily by the spoon-shaped bill and the blue marking on the wing.

## PINK-EARED DUCK.

*Malacorhynchus membranaceus*, Latham.*Anas membranacea*, Latham, Index Orni. Supp. (1801), p. LXIX.

Range—Tasmania and Australia.

Head greyish white. Dark patch round eye, behind which is pink spot. Upper brown. Under greyish white, barred brown. White on wing. Bill, tarsi, and feet slatey-blue.

Dimensions—Length, 420 mm. Bill, 65 mm. Wing, 180 mm. Tail, 65 mm. Tarsus, 37 mm.

Nest and Eggs—Nest usually deserted Raven or Heron's nest. Eggs (7-9) creamy white (46 mm. x 32 mm.). Nests September to December.





At S. R. Shollard Photo.

Black Swans on Montrose Lagoon, East Coast.



Black Swan and Albino.

M. S. R. Sturford Photo

References—Gould, Birds of Australia, Volume VII., pl. 13. Mathews, Birds of Australia, Volume IV., pl. 214.

The Pink-eared Duck is not a common species in Tasmania. It may be observed occasionally in the Lakes district, and in certain seasons on the Derwent. Its distinguishing feature is the pink spot between the eye and the ear. On the mainland this bird is sometimes referred to as the "Widgeon" by shooters. At times it is fairly common on King Island. It is also occasionally seen on the East Coast.

### FRECKLED DUCK.

*Stictonetta na cosa*, Gould.

*Anas na cosa*, Gould, P.Z.S. (1840), VIII., p. 177.

Range—Tasmania and Australia.

Entire plumage brown, freckled whitish buff. Under surface paler. Bill greyish. Feet bluish.

Dimensions—Length, 520 mm. Bill, 50 mm. Wing, 235 mm. Tail, 85 mm. Tarsus, 45 mm.

Nest and Eggs—Nest on ground. Eggs (8-10) greenish white (53 mm. x 40 mm.).

References—Gould, Birds of Australia, Volume VIII., pl. 10. Mathews, Birds of Australia, Volume IV., pl. 215.

The Freckled Duck is met, with occasionally in the Lakes district and in parts of the Midlands, but it cannot be considered at all a common species as far as Tasmania is concerned. The uniform freckled nature of its plumage makes this duck easy to identify. Occasionally plentiful on King Island.

### WHITE-EYED DUCK.

*Ngara australis*, Eyton.

*Ngara australis*, Eyton, Mon. Ant. (1838), p. 160.

Range—Tasmania and Australia.

Chestnut brown plumage. Light buff band across breast. White markings on wing. Eye white. Bill bluish black. Tarsi and feet grey. Under tail white.

Dimensions—Length, 450 mm. Bill, 47 mm. Wing, 225 mm. Tail, 60 mm. Tarsus, 37 mm.

Nest and Eggs—Nest on ground or in hollow tree. Eggs (8-13) creamy white (55 mm. x 40 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume VII., pl. 16. Mathews, Birds of Australia, Volume IV., pl. 216.

The rapid flying White-eyed Duck or "Widgeon" is a well distributed species, but is by no means as common, generally speaking, as the Black Duck or Teal. This species is sometimes referred to in the vernacular as the "Hardhead."

## BLUE-BILLED DUCK.

*Oxyura australis*, Gould.*Oxyura australis*, Gould, P.Z.S. (1836), IV., p. 85.

Range—Tasmania and Australia.

Head, throat, and neck black. Breast and back chestnut. Wings and tail dark brown. Bill light blue.

Dimensions—Length, 420 mm. Bill, 42 mm. Wing, 155 mm. Tail, 70 mm. Tarsus, 37 mm.

Nest and Eggs—Nest on ground. Eggs (4-5) greenish white (67 mm. x 45 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume VII., pl. 17. Mathews, Birds of Australia, Volume IV., pl. 217.

The Blue-billed Duck is a rather rare species in certain parts of Tasmania. This bird is an excellent swimmer, and usually does not rise far off the water when disturbed in the day time. It can undoubtedly fly long distances, and probably reserves its flights for the nocturnal hours, when at a high elevation it covers far greater distances than is generally supposed. During recent years this species seems to have increased, so far as the Northern portion of the island is concerned.

## MUSK DUCK.

*Biziura lobata*. Shaw and Nodder.*Anas lobata* Shaw and Nodda Nat. Misc. (1796), VIII., p. 255.

Range—Tasmania and Australia.

Blackish brown, mottled white. Tail long and stiff. Male has green musk scented lobe under bill. Bill greenish black. Tarsi and feet grey.

Dimensions—Length, 650 mm. Bill, 40 mm. Wing, 240 mm. Tail, 125 mm. Tarsus, 45 mm. Female very much smaller.

Nest and Eggs—Nest on ground. Eggs (2-3) greenish white (80 mm. x 53 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume VII., pl. 18. Mathews, Birds of Australia, Volume IV., pl. 218.

The Musk Duck is a remarkable bird in many ways, and is the only species of its genus (*Biziura*). The male has a distinctive green musk scented lobe under the bill, and is very much larger than the female. These birds fly mainly at night, and when disturbed in the day time take refuge by diving, and remaining practically submerged.

## ORDER ACCIPITRIFORMES (Diurnal Birds of Prey).

The *Accipitriformes* form an order which, as far as Tasmania is concerned, is more evenly distributed than any other. The peculiar climatic conditions, together with the marked geological and botanical zones which occur in our mountainous island State, naturally have an effect on the distribution of the fauna.

The birds of prey, however, are to be seen soaring over the dense beech forests of our West Coast with the same graceful undulations with which they hawk over the open plains of the Midlands or the Eucalypt forest country towards the East.

The outstanding distinguishing features of the order are the short and strong bill and the powerful talons, which are used both to seize and carry off their prey. Another characteristic, which is almost universal as far as the *Accipitriformes* are concerned, is that the female is usually larger than the male.

Included in the order is the Wedge-tailed Eagle—the largest true Eagle in the world—and, as is the case with nearly all species, the insular Tasmanian form is larger than the mainland one. We should be proud of this King of the Air instead of using such vernacular terms as "Eaglehawk." Our schoolboys are taught of the Golden Eagle of Europe, but the more magnificent bird probably soaring in the celestial blue above the schoolhouse—is disregarded.

The hawk tribe constitute a very much misunderstood group. Many of them are insect eaters, and do much to preserve the balance of Nature which allows man to cultivate the earth. Instead of continuing to disturb this balance more than our civilisation has already done, we should strive to retain, by protective and educational forces, the necessary items of the great plan of the universe. The more man interferes, the harder will be his task, and no section of the community is more concerned in this matter than the farmer. Yet the average farmer is one of the worst enemies of many species of birds if not of bird life as a whole. He generally has hereditary ideas, almost always erroneous, and refuses to heed the advice of those who have studied the question of the economic value of bird life from a scientific standpoint. If he would only act on facts instead of hereditary errors, the farmer would come to see that many birds which he now shoots as pests are in reality his best friends. These remarks may well be applied to the hawks and their allies, and it is to be hoped that with the increase of knowledge concerning our bird life which is generally becoming more manifest, it will not be many years before the average farmer gives up his present habit of rushing for a gun as soon as he sees a member of the order at present under review, without waiting to consider whether it is an Eagle or a Kestrel. At the present time, to the average farmer, the designation "Hawk" is sufficient, and the verdict "Death."

### SPOTTED HARRIER.

*Circus assimilis*, Jardine & Selby.

*Circus assimilis*, Jard. & Selby, Ill. Orn. (1828), II., pl. 51.

Range—Tasmania and Australia.

Head and neck reddish, streaked black. Above grey. Tail greyish brown, barred white. Under rufous, spotted with round white spots. Bill bluish black. Legs yellow. Female larger.

Dimensions—Length, 500 mm. Bill, 29 mm. Wing, 400 mm. Tail, 250 mm. Tarsus, 90 mm.

Nest and Eggs—Nest of sticks and twigs, lined green leaves. Eggs (2-3) bluish white (50 mm. x 40 mm.). Nests August to December.

References—Gould, Birds of Australia, Volume I., pl. 27. Mathews, Birds of Australia, Volume V., pl. 234.

The Spotted Harrier is by no means common in Tasmania, and is of a rather shy disposition. Its flight is usually slow and measured as it hawks over the swamps at low altitude in search of small mammals, reptiles, small birds, and insects, which form its diet. "Rarely, if ever, is it a menace to the farmer's poultry yard." (Littler, Birds of Tasmania, p. 2.)

## SWAMP HARRIER ("Swamp Hawk").

*Circus approximans*, Peale.*Circus approximans*, Peale, U.S. Exp. Expd. (1848), VIII., p. 64.

Range—Tasmania, Australia, and islands to the North.

Tasmanian form —*Circus approximans gouldi*.

Head and upper surfaces dark brown. Tail grey, upper portion white. Under surface streaked pale buff and rufous. Bill brown. Tarsi greenish. Feet yellow.

Dimensions—Length, 600 mm. Bill, 35 mm. Wing, 418 mm. Tail, 250 mm. Tarsus, 100 mm.

Nest and Eggs—Nest of coarse grass, on ground. Eggs (3-6) white (51 mm. x 39 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume I., pl. 26. Mathews, Birds of Australia, Volume V., pl. 235.

The Swamp Hawk is fairly numerous in some localities, and is to be seen usually near swamps and river flats. The food of this species consists of small mammals, reptiles, and birds, and the species is accused of raiding the poultry yard occasionally in order to exact payment for services rendered in keeping in check harmful rodents, reptiles, etc. It is recognised easily by the white band at the upper base of the tail.

## WHITE GOSHAWK.

*Astur novæ-hollandiæ*, Gmelin.*Falco novæ-hollandiæ*, Gmelin, Syst. Nat. (1788), p. 264.

Range—Tasmania, South and Eastern Australia.

Entire plumage white. Bill and claws black. Legs yellow.

Dimensions—Length, 500 mm. Bill 27 mm. Wing, 300 mm. Tail, 200 mm. Tarsus, 70 mm. Female larger.

References—Gould, Birds of Australia, Volume I., pl. 15. Mathews, Birds of Australia, Volume V., pl. 237.

This species is to be met with occasionally in most parts of Tasmania, but its conspicuous plumage generally leads to it being shot. Both this species and the White Egret are protected, but they are often shot and forwarded to the Museums as "strange birds." Such destruction is to be regretted, and it needs a certain amount of diplomacy to write and return thanks for the donation, and at the same time to point out the error of the donor's ideas. Its food consists of small mammals, reptiles, birds, etc.

## AUSTRALIAN GOSHAWK.

*Astur fasciatus*, Vigors & Torsfield.*Astur fasciatus*, Vig. & Hors., Trans. Linn. Soc. (1827), XV., p. 181.

Range—Tasmania, Australia, and islands to the North.

Upper surfaces brown. Under buff, barred with brown. Bill brownish. Legs and feet yellowish.

Dimensions—Length, 500 mm. Bill, 26 mm. Wing, 207 mm. Tail, 250 mm. Tarsus, 77 mm. Female larger.

**Nest and Eggs**—Nest of sticks. Eggs (2-3) white, stained buff (45 mm. x 35 mm.). Nests August to December.

**References**—Gould, Birds of Australia, Volume I., pl. 17. Mathews, Birds of Australia, Volume V., pl. 238.

This species is far more common than the White Goshawk but, like the former, it is shot on sight when near a homestead, as it occasionally levies toll on the poultry. More often, however, he is there to secure sparrows and starlings, of which this species is particularly fond, but the minute the hens begin to cackle there is a rush for a gun, and the sparrows and starlings are thus allowed to feed upon the farmer's grain in peace.

## COLLARED SPARROW HAWK.

*Accipiter cirrocephalus*, Vieillot.

*Sparvius cirrocephalus*, Vieillot, Nov. Diet. d'Hist. Nat. (1817), X., p. 329.

**Range**—Tasmania, Australia, and New Guinea.

**Head** grey. Upper surfaces blackish grey. Reddish collar. Under reddish, barred white. Bill brownish. Legs yellow.

**Dimensions**—Length, 400 mm. Bill, 23 mm. Wing, 270 mm. Tail, 215 mm. Tarsus, 70 mm. Female larger.

**Nest and Eggs**—Nest of sticks. Eggs (3) whitish, stained buff (40 mm. x 32 mm.). Nests August to November.

**References**—Gould, Birds of Australia, Volume I., pl. 19. Mathews, Birds of Australia, Volume V., pl. 239.

The Collared Sparrow Hawk is a very quick flyer, and takes toll of the smaller birds, as well as mice, etc. As with all hawks, the sexes vary greatly in size, but with this species the variation is very marked. The measurements given above are for a female specimen, the male would be much smaller. One selected at random from a series of skins gave the following measurements: L. 305, B. 12, W. 200, T. 150, Tar. 55 mm.

## WHITE-BREASTED SEA EAGLE.

*Haliaetus leucogaster*, Gmelin.

*Falco leucogaster*, Gmelin, Syn. Nat. (1788), p. 257.

**Range**—Tasmania, Australia, and through the islands to India.

**Head, neck and under plumage** white. Upper brownish grey. Tail blackish brown. Bill bluish. Feet yellowish white.

**Dimensions**—Length, 770 mm. Bill, 40 mm. Wing, 575 mm. Tail, 250 mm. Tarsus, 85 mm.

**Nest and Eggs**—Nest of sticks, lined green leaves. Eggs (1-2) white, faint red markings (70 mm. x 50 mm.). Nests August to November.

**References**—Gould, Birds of Australia, Volume I., pl. 3. Mathews, Birds of Australia, Volume V., pl. 243.

The Sea Eagle may be seen at many places along the coast, soaring along the shore in search of dead fish, molluses, etc., upon which it feeds. Each pair of birds seems to have its own domain—usually a sandy bay on the coast. They nest regularly on such places as Bruny Island, usually choosing a tall tree on the cliffs at the head or end of a bay.

## WEDGE-TAILED EAGLE.

*Uroæetus audax*, Latham.



## Wedge-Tailed Eagle (Continued).

*Vultur audax*, Latham, Index Orni. (1801), Supp. 2.

Range—Tasmania and Australia.

Largest Eagle in the world. Upper blackish brown. Under slightly paler. Bill yellowish, tip black. Feet horn colour. Plumage darkens with age, and old birds are almost black.

Dimensions—Length, 1075 mm. Bill, 60 mm. Wing, 600 mm. Tail, 425 mm. Tarsus, 100 mm.

Nest and Eggs—Nest of sticks. Eggs (1-2) white, faint brown and purple markings (73 mm. x 60 mm.). Nests September to November.

References—Gould, Birds of Australia, Volume I., pl. 1. Mathews, Birds of Australia, Volume V., pl. 241.

The Wedge-tailed Eagle is shot by shepherds owing to its alleged destruction of lambs. Its ordinary diet consists of rabbits and other small game, carrion, etc. The size of the Wedge-tailed Eagle is often questioned, and incorrect information published concerning this species. The largest bird of which we know had a wing spread of nine feet four inches (authenticated by A. R. Reid, Curator, Beaumaris Zoo, Hobart). This specimen was shot on the East Coast, and was an aged bird, being almost black.

## BLACK-CHEEKED FALCON.

*Falco peregrinus*, Tunstall.

*Falco peregrinus*, Tunstall, Ornith. Brit (1771), p. I.

Range—Tasmania, Australia, and cosmopolitan.

Crown and sides of head black. Upper surface brownish black. Under buff, barred black back. Bill greenish, black tip. Feet yellow.

Dimensions—Length, 455 mm. Bill, 30 mm. Wing, 330 mm. Tail, 155 mm. Tarsus, 55 mm.

Nest and Eggs—Nest on cliffs. Eggs (2-3) buff, chestnut markings (50 mm. x 38 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume I., pl. 8. Mathews, Birds of Australia, Volume V., pl. 254.

The Black-cheeked Falcon is a variety of the Old World Peregrine Falcon, and is one of the swiftest flying birds of prey. It feeds mainly on smaller birds, and is particularly destructive to pigeons. For this reason the Homing Associations offer rewards for the heads of this species, but their efforts are of little avail, as the birds are difficult to shoot. They soar high in the heavens, and descend "like a bolt from the blue" upon their prey.

## LITTLE FALCON.

*Falco longipennis*, Swainson.

*Falco longipennis*, Swainson, Ann. in Menag. (1838), p. 341.

Range—Tasmania and Australia.

Head greyish. Forehead and throat white. Upper dark brown. Under rufous brown. Bill bluish. Legs and feet yellowish.

Dimensions—Length, 320 mm. Bill, 17 mm. Wing, 255 mm. Tail, 137 mm. Tarsus, 40 mm.

Nest and Eggs—Nest of sticks. Eggs (2-3) pale buff, marked brown (38 mm. x 30 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume I., p. 10. Mathews, Birds of Australia, Volume V., p. 252.

The Falcon is a variety of the Old World Hobby or Merlin, and although one of the smallest of our *Accipitres*, yet is one of the swiftest fliers, as well as being bold and fierce.

## BROWN HAWK.

*Ieracidea berigora*, Vigors & Horsfield.

*Falco berigora*, Vigs. & Horsfield, Trans. Linn. Soc. (1827), XV., p. 184.

Range—Tasmania and Australia.

Head and upper plumage dark brown. Under surface buff, spotted darker. Bill, yellow. Feet brownish.

Dimensions—Length, 450 mm. Bill, 25 mm. Wing, 345 mm. Tail, 200 mm. Tarsus, 60 mm.

Nest and Eggs—Nest of sticks. Eggs (2-3) buff, marked brown (51 mm. x 40 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume I., pl. 11. Mathews, Birds of Australia, Volume V., pl. 256.

The Brown Hawk is a fairly common species. Its food consists mainly of insects, but occasionally it takes birds, and also interferes with the farmer's chickens. As far as can be judged, however, it does far more good than harm.

## KESTREL.

*Cerchneis cenchroides*, Vigors & Horsfield.

*Falco cenchroides*, Vig. & Hors., Trans. Linn. Soc. (1827), XV., p. 183.

Range—Tasmania and Australia.

Upper reddish, spotted black. White streak behind eye. Tail rufous, barred black, white tip. Chest buff. Under buff white. Bill greyish. Legs and feet yellow.

Dimensions—Length, 340 mm. Bill, 15 mm. Wing, 250 mm. Tail, 145 mm. Tarsus, 37 mm.

Nest and Eggs—Nest in hole in tree or cliff. Eggs (4) buff, spotted red (41 mm. x 35 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume I., pl. 13. Mathews, Birds of Australia, Volume V., pl. 257.

The Kestrel is a most valuable economic bird, as it feeds on insects and mice. It is by no means plentiful in Tasmania, and its rarity is increased by the fact that when it comes near a farm to assist in clearing the locality of mice and insect pests a rush is made for the gun to shoot "the hawk."



Typical Section of Tasmanian Beach, showing Silver Gulls (*L. nova-hollandiae*), and other birds feeding.

F. B. Cane Photo



Masked Owl,

Tasmanian Museum

## WHITE-HEADED OSPREY ("Fish Hawk").

*Pandion haliaetus*, Linnaeus.*Falco haliaetus*, Linn. Syst. (1758), p. 91.

Range—Coasts of Tasmania, Australia, and islands to the North.

Tasmanian form—*Pandion haliaetus cristatus*, Vieillot, Nov. Diet. d'Hist. Nat. (1816). IV., p. 181. Tasmania and Australia.

Crown, neck, abdomen, and under tail white. Chest mottled brown. Wings blackish brown. Bill black. Feet bluish white.

Dimensions—Length, 500 mm. Bill, 33 mm. Wing, 440 mm. Tail, 200 mm. Tarsus, 60 mm.

Nest and Eggs—Immense nest of sticks, etc., on rock. Eggs (2) yellowish blotched brown (60 mm. x 40 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume I., pl. 6. Mathews, Birds of Australia, Volume V., pl. 259.

The White-headed Osprey is rather a solitary bird, and is often spoken of as the Fish Hawk. It must not, however, be confused with the White-bellied Sea Eagle.

## ORDER STRIGIFORMES (Nocturnal Birds of Prey).

The *Strigiformes* form an order of birds easily distinguished. All the species are owl-like birds with soft plumage to enable silent flight. The eyes being adapted for nocturnal and crepuscular methods of life, face forwards, and are surrounded by a facial disc. The soft plumage is essential, as these birds do all their hunting during the night, and any noise made in flight would immediately warn the small mammals upon which they prey.

The Owls are very much misunderstood by the average country dweller, and in many cases he shoots his best friend without knowing it. All through the silent hours of the night, whilst the farmer sleeps, the Owls are patrolling his property, and endeavouring to keep in check the rodents and other pests that at times do so much damage.

A scientific investigation of the food of owls can be easily carried out without the necessity of gathering "stomach contents," as is necessary with most species. The bones, fur, etc., of the animals and the elytra of beetles, etc., upon which owls feed are regurgitated in the form of pellets, and if a collection of these pellets be made it only needs a little zoological knowledge and a little care in dissecting the specimens to arrive at the correct diet of the owl tribe.

This diet will invariably be found to be species of rodents, beetles, etc., that are considered to be harmful. When birds are taken it is usually one or other of two introduced pests, the Sparrow or the Starling. The pastoralist may claim that the starling is not a pest, but he overlooks the fact that the starling is increasing in numbers, and is driving out many of our native birds of great economic value.

## SPOTTED OWL.

*Ninox nova-zealandia*, Gmelin.*Strix nova-zealandia*, Gmelin, Syst. Nat. p. 296 (1788).

Range—Tasmania and South-Eastern Australia.

Tasmanian form—*Ninox nova-zealandia clelandi*, Mathews.

Upper surface dark brown. Under rufous brown. Spotted white. Bill brown colour. Feet yellowish.

Dimensions—Length, 300 mm. Bill, 25 mm. Wing, 200 mm. Tail, 120 mm. Tarsus, 37 mm.

Nest and Eggs—Nest in hollow of tree. Eggs (2) white (40 mm. x 34 mm.). Nests October to December.

Reference—Mathews, Birds of Australia, Volume V., pl. 263.

The Spotted Owl is the bird which utters the cry "More-pork, more-pork." It is fairly common and evenly distributed, and in the evening it sallies forth in search of mice and insects, which constitute its main items of food. It helps to keep the sparrow pest down by catching sparrows out of covered trees at night.

## BARN OWL.

*Tyto alba*, Scapoli.*Strix alba*, Scapoli, Ann. Hist. Nat. (1769), p. 21.

Range—Tasmania, Australia, and cosmopolitan.

Tasmanian form—*Tyto alba delicatula*, Gould, P.Z.S. (1836), p. 140.

Above delicate grey, with faint markings. Under white, sparingly dotted. Facial disc white, edged buff. Bill horn colour. Feet yellowish.

Dimensions—Length, 400 mm. Bill, 21 mm. Wing, 280 mm. Tail, 110 mm. Tarsus, 70 mm.

References—Gould, Birds of Australia, Volume I. pl. 66. Mathews, Birds of Australia, Volume V., pl. 268.

The Barn or Delicate Owl is very closely related to the Barn Owls of the Old World, and is a most valuable bird from the economic standpoint, as it destroys large numbers of rats, mice, and other harmful rodents. One of us had previously recorded this species as an "accidental," and placed it on the Tasmanian faunal list as such, but since then further specimens have been secured, and the species can without doubt be given its place on the Tasmanian list without any reservations.

## MASKED OWL (Chestnut-faced Barn Owl).

*Tyto nova-hollandia*, Stephens.*Strix nova-hollandia*, Stephens, Shaw, Gen. Zool. (1826), XIII., p. 61.

Range—Tasmania and South-Eastern Australia.

Tasmanian form—*Tyto nova-hollandia castanops*, Gould, P.Z.S. (1836), p. 140.

Above golden brown. Under buff, spotted. Fascial disc deep chestnut, fringed black. Tarsi, etc.

Dimensions—Length, 520 mm. Bill 37 mm. Wing, 350 mm. Tail, 165 mm. Tarsus, 70 mm.

Nest and Eggs—Undescribed. Probably lays white eggs (2), in the hollow of a lofty eucalypt.

References—Gould, Birds of Australia, Volume I., pl. 28. Mathews, Birds of Australia, Volume V., pl. 270.

The Masked or Chestnut-faced Owl is fairly evenly distributed. It is a valuable species, as it works all through the night around the barns and hayricks destroying the rats, mice, and other harmful rodents. In return for doing this work it is often shot.

### ORDER PSITTACIFORMES (Parrot-like Birds).

The members of this order are distinguished by their zygodactyl feet, and the bill being short and stout.

The Parrots are usually brightly coloured, and often favoured as pets, as they make good cage birds, and can be taught to talk in quite a humorous fashion.

Parrots of one species or another are to be met with in most parts of Tasmania, although, with the advance of settlement, some of the more terrestrial species are becoming rare.

Amidst the tall timber of the mountains the piercing notes of the Black or the White Cockatoos usually may be heard, whilst in the smaller timber the Green Parrot is a common sight. Among the more open timber of the plains the brightly coloured Rosellas are common, while the Brush-tongued Parrots or Lorikeets often are to be seen in flocks in the flowering eucalypts.

### RAINBOW LORIKEET (Blue-bellied Lorikeet).

*Trichoglossus moluccanus*, Gmelin.

*Psittacus moluccanus*, Gmelin, Syst. Nat. (1788), p. 316.

Range—Tasmania and Australia.

Head, throat, and abdomen blue. Chest red. Upper green. Bill red. Feet brownish black.

Dimensions—Length, 310 mm. Bill, 17 mm. Wing, 160 mm. Tail, 145 mm. Tarsus, 14 mm.

Nest and Eggs—Nest in hole in tree. Eggs (2-3) white (27 mm. x 23 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume V., pl. 48. Mathews, Birds of Australia, Volume VI., pl. 275.

The Rainbow Lorikeet, like most of the brush-tongued parrots, is to be met with usually in flocks, particularly amongst the tall flowering eucalypts. The birds are very fast fliers, and cover large areas of country in search of food.

The entirely blue head and blue markings on the abdomen serve as distinguishing features.

## MUSK LORIKEET.

*Glossopsitta concinna*, Shaw.*Psittacus concinnus*, Shaw, Nat. Miscel. (1791), pl. 87.

Range—Tasmania and South and Eastern Australia.

General colour green. Forehead and streak behind eye red. Bill black, tip red. Feet black.

Dimensions—Length, 235 mm. Bill, 14 mm. Wing, 123 mm. Tail, 90 mm. Tarsus, 13 mm.

Nest and Eggs—Nest in hole in tree. Eggs (2-4) white (24 mm. x 21 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume V., pl. 52. Mathews, Birds of Australia, Volume VI., pl. 279.

The Musk Lorikeet is the commonest of the three Tasmanian Brush-tongued Parrots. It is known not only for its loud screechings amidst the eucalypt blossom, but also for its excursions into the orchards and gardens.

The red forehead and distinctive red streak behind the eye, together with a more or less pronounced yellowish patch on each side of the lower breast serve as distinctive features.

## LITTLE LORIKEET.

*Glossopsitta pusilla*, White.*Psittacus pusillus*, White, Jrn. Voy., N.S.W. (1790), p. 262.

Range—Tasmania, South and Eastern Australia.

General colour green. Face red. Hind neck brown. Bill black. Feet blackish.

Dimensions—Length, 165 mm. Bill, 11 mm. Wing, 103 mm. Tail, 59 mm. Tarsus, 9 mm.

Nest and Eggs—Nest in hole in tree. Eggs (4) white (20 mm. x 16 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume V., pl. 54. Mathews, Birds of Australia, Volume V., pl. 279.

The small species, which in total length is little more than half that of the Blue-bellied Lorikeet, is the smallest of the purely Australian family *Loriida*. Its habits are very similar to that of the other Lorikeets.

The red colouration of the forehead and sides of face, the absence of the red streak behind the eye, and the general small size of the bird form an easy method of identification.



## YELLOW-TAILED BLACK COCKATOO.

*Calyptrorhynchus funereus*, Shaw & Nodder.*Psittacus funereus*, Shaw & Nodd., Nat. Miscel. (1794), VI., p. 186.

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Calyptrorhynchus funereus xanthanotus*, Gould, Syn. Birds Aust. (1838), IV., App., p. 5.

Brownish black. Ear coverts yellow. Tail banded yellow. Bill black. Feet blackish.

Dimensions—Length, 620 mm. Bill, 48 mm. Wing, 380 mm. Tail, 255 mm. Tarsus, 28 mm.

Nest and Eggs—Nest in hole in tree. Eggs (2) white (47 mm. x 33 mm.). Nests November to January.

References—Gould, Birds of Australia, Volume V., pl. 12. Mathews, Birds of Australia, Volume VI., pl. 285.

The Black Cockatoo is the largest of the *Psittaciformes*, and is well distributed over the island. This species is particularly fond of the white grubs which are to be found in decaying wood or under the bark of dead trees. With the aid of its very powerful bill the Black Cockatoo can soon tear off the dead bark or make veritable burrows into decaying beech logs.

## GANG GANG COCKATOO.

*Callocephalon fimbriatus*, Grant.*Callocephalon fimbriatus*, Grant, Narr. Voy. Disc. (1803), p. 135.

Range—Tasmania, King Island, South and Eastern Australia.

Male with sides of face and prominent crest bright red. General colour slaty grey. Crest feathers margined white. Bill horn colour. Legs and feet black.

Dimensions—Length, 357 mm. Bill, 30 mm. Wing, 240 mm. Tail, 123 mm. Tarsus, 18 mm.

Nest and Eggs—Nest in hole in tree. Eggs (4-5) white (33 mm. x 26 mm.).

References—Gould, Birds of Australia, Volume V., pl. 14. Mathews, Birds of Australia, Volume VI., pl. 286.

The Gang Gang Cockatoo is found on King Island, but its appearance in Tasmania is rare.

The prominent red nuchal crest of the male bird and the general total slaty grey plumage of both sexes afford a type of colouration distinct among the Tasmanian *Psittaciformes*.

## WHITE COCKATOO.

*Cacatua galerita*, Latham.*Psittacus galeritus*, Latham, Index. Orni. (1790), I., p. 109.

Range—Tasmania and Australia.

Tasmanian form—*Cacatua galerita licetorhyncha*, Bonaparte, Comp. Rend. Sci. (1850), XXX., p. 139.

Plumage white. Yellow crest. Tail and under wing sulphur yellow. Bill black. Legs and feet blackish.

Dimensions—Length, 520 mm. Bill, 45 mm. Wing, 360 mm. Tail, 175 mm. Tarsus, 25 mm.

Nest and Eggs—Nest in hole in tree. Eggs (2-3) white (50 mm. x 32 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume V., pl. 1. Mathews, Birds of Australia, Volume VI., pl. 287.

The White or Sulphur Crested Cockatoo is a species which shows a large amount of intelligence. When a flock descends upon a farmer's grain paddock a sentinel is always posted to give warning if danger approaches. This sentinel is regularly relieved at intervals. To see this species at its best one must see them amidst the dark green foliage of the mountain forests.

### GALAH (Rose-breasted Cockatoo).

*Cacatua roseicapilla*.

*Cacatua roseicapilla*, Vieillot, Nouv. Diet. d'Hist. Nat. (1817), XVII., p. 12.

Range—Tasmania (accidental) and Australia.

Head pink. Upper grey. Under surface and neck rose red. Bill horn colour. Legs and feet brown.

Dimensions—Length, 60 mm. Bill, 25 mm. Wing, 260 mm. Tail, 133 mm.

Nest and Eggs—Nest in hole in tree. Eggs (4-5) white (35 mm. x 25 mm.).

References—Gould, Birds of Australia, Volume V., pl. 4. Mathews, Birds of Australia, Volume VI., pl. 291.

"The Galahs" that have been recorded from Tasmania can be classed as accidentals or escapees. In 1922 a flock suddenly appeared in the Huon district, but it was found that these had escaped from a cage on a vessel which was moored in the river. This flock will probably increase.

### COCKATIEL (Cockatoo-Parrot).

*Leptolophus hollandicus*, Kerr.

*Psittacus hollandicus*, Kerr, Animal Kingdom (1792), p. 580.

Upper surface dusky brown, crest on head. Ear coverts orange, Large white patch on wings.

Dimensions—Length, 330 mm. Bill, 15 mm. Wing, 170 mm. Tail, 175 mm. Tarsus, 12 mm.

Nest and Eggs—Nest in a hole in tree. Eggs (5-7) white (25 mm. x 18 mm.).

References—Gould, Birds of Australia, Vol. VI., pl. 45. Mathews, Birds of Australia, Vol. VI., pl. 292.

There is one record of this species in Tasmania (R. Hall, The Emu, Vol. IX., p. 54).

## GREEN ROSELLA (Green Parrot).

*Platycercus caledonicus*, Gmelin.*Psittacus caledonicus*, Gmelin, Syst. Nat. (1788), p. 328.

Range—Tasmania (including Bass Straits Islands).

General colour green, forehead red, cheeks blue. Under yellowish. Bill horn colour. Legs and feet black.

Dimensions—Length, 365 mm. Bill, 18 mm. Wing, 180 mm. Tail, 195 mm. Tarsus, 20 mm.

Nest and Eggs—Nest in hole in tree. Eggs (6-9) white (29 mm. x 23 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume V., pl. 24. Mathews, Birds of Australia, Volume VI., pl. 302.

This species, also known as the Green Parrot, Yellow-breasted Parrot, and "Mountain Parrot," is an endemic Tasmanian form, which is fairly common. Amidst the smaller eucalypts, particularly along the fringe of the forests, small flocks of this species usually are to be observed. Its general green colouration, blue wing markings, blue cheeks, and yellow under surface serve to make its identification easy. When disturbed it usually flies a short distance, then perches and watches one.

## WHITE-CHEEKED ROSELLA.

*Platycercus eximius*, Shaw and Nodder.*Psittacus eximius*, Shaw and Nodder, Nat. Mus. (1792), III., p. 93.

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Platycercus eximius diemenensis*, North, Aust. Mus. Cat. (1911), III., p. 128.

Crown, chest and under tail scarlet. Cheeks white. Back black, edged yellow. Under and base of tail green. Wing and tail tinged blue. Bill horn colour. Feet black.

Dimensions—Length, 335 mm. Bill, 18 mm. Wing, 163 mm. Tail, 180 mm. Tarsus, 20 mm.

Nest and Eggs—Nest in hole in tree. Eggs (6-9) white (28 mm. x 21 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume V., pl. 28. Mathews, Birds of Australia, Volume VI., pl. 306.

Throughout Tasmania, wherever the conditions are suitable for members of the Parrot family, this species may be met with. Its brilliant colouring and sharp "pick, pick" soon attract attention. It is generally known as "the Rosella." On King Island there is an additional form, the Crimson Rosella (*P. elegans*).

## BLUE-WINGED GRASS PARROT.

*Neophema chrysostoma*, Kuhl.*Psittacus chrysostomus*, Kuhl, Nov. Act. Phys. Acad. L.C. (1820), X., p. 50.

Range—Tasmania, South and Eastern Australia.

Blue wing. Head and breast green. Forehead with blue band. Under yellowish. Bill brown. Feet brownish.

Dimensions—Length 223 mm. Bill, 11 mm. Wing, 112 mm. Tail, 127 mm. Tarsus, 15 mm.

Nest and Eggs—Nest in hole in tree or log. Eggs (5-7) white (22 mm. x 19 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume V., p. 37. Mathews, Birds of Australia, Volume VI., pl. 316 (lower fig.).

The Blue-winged Grass Parrot (Parrakeet) is not by any means a common species, but is distributed fairly widely in localities suitable for its habits. The blue frontal band (which is not so pronounced in the female), the rich blue wing, and the entire under surface greenish yellow, serve as distinguishing characteristics for this species.

## ORANGE-BREASTED GRASS PARROT.

*Neophema chrysogaster*, Latham.*Psittacus chrysogaster*, Latham, Index. Orni. (1790), I., p. 97.

Range—Tasmania, South and Eastern Australia.

Under orange yellow, with distinctive orange mark near vent. Upper green. Blue markings on wing. Blue forehead. Bill black. Feet brownish.

Dimensions—Length, 218 mm. Bill, 11 mm. Wing, 106 mm. Tail, 110 mm. Tarsus, 14 mm.

Nest and Eggs—Nest in hollow of fallen tree. Eggs (4-6) white (20 mm. x 17 mm.). Nests November to December.

References—Gould, Birds of Australia, Volume V., pl. 39. Mathews, Birds of Australia, Volume VI., pl. 316 (upper fig.).

The Orange-bellied Grass Parrot (Parakeet) was once very common, but, like other terrestrial forms, it is feeling the advance of settlement. The orange colouration on under surface, lesser blue markings on wing, and the very much paler frontal band distinguish this species from the Blue-winged Grass Parrot.

## SWIFT PARROT.

*Lathamus discolor*, Shaw.*Psittacus discolor*, Shaw, White's Jrn. Voy. N.S.W. (1790), p. 263.

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Lathamus discolor tregallasi*, Mathews, Nov. Zool. (1912), XVIII., p. 279.

Green. Forehead scarlet. Crown of head blue. Shoulders and base of tail red. Bill yellowish. Feet brown.

Dimensions—Length, 257 mm. Bill, 13 mm. Wing, 125 mm. Tail, 125 mm. Tarsus, 12 mm.

Nest and Eggs—Nest in hole in tree. Eggs (2-4) white (24 mm. x 20 mm.). Nests November to December.

References—Gould, Birds of Australia, Volume V., pl. 47. Mathews, Birds of Australia, Volume VI., pl. 321.

The Swift Parrot is often found in company with the Lorikeets, which it resembles greatly in some general respects. In fact its exact classification has given rise to considerable discussion at times.

The swiftness of their flight, the red forehead and throat, with blue on the crown of the head are the distinguishing features of this species. During some years this species appears to be very plentiful, and they are to be met with in numbers everywhere, whereas in other years only a few flocks are seen.

## GROUND PARROT.

*Pezoporus wallicus*, Kerr.

*Psittacus wallicus*, Kerr, Animal Kingdom, p. 581 (1792).

Range—Tasmania and Australia.

Tasmanian form—*Pezoporus terrestris leachi*, Mathews, Nor. Zool (1912), XVIII., p. 217.

Touched crimson. General plumage green, barred black and gold. Bill horn colour. Feet bluish.

Dimensions—Length, 310 mm. Bill, 15 mm. Wing, 127 mm. Tail, 187 mm. Tarsus, 20 mm.

Nest and Eggs—Nest on ground. Eggs (3-4) white (25 mm. x 22 mm.). Nests September to November.

References—Gould, Birds of Australia, Volume V., pl. 46. Mathews, Birds of Australia, Volume VI., pl. 323.

This purely terrestrial species is now becoming rare, as it now has so many enemies to contend with. The first specimen of the species collected in Tasmania was apparently obtained by M. Labillardiere, the Naturalist and Historian of D'Entrecasteaux's expedition.

During the second visit to D'Entrecasteaux Channel in 1793 Labillardiere records, under date of 11th February:—"As I advanced toward the South-west I crossed over some open spots, where I killed a beautiful species of Paroquet, which I distinguish by the name of the Black-spotted Paroquet of Diemen's Cape (see plate X.). I had already met with it in several other places, but always such, as were low and destitute of covert. Very different from the known species of the same genus, it does not perch, for I uniformly saw it rise among the grass, on which it almost immediately settled again."

## ORDER CORACIIFORMES (Picarian Birds).

The Picarian Birds constitute an order, the members of which usually have very weak feet.

In Tasmania there are six resident or migratory forms, and one "accidental" which can be included in the order under review. Two belong to the Frogmouth family, two to the Kingfishers, and two to the Migratory family of the Swifts. The "accidental" is the Roller or Dollar Bird, which has been recorded on one occasion only.

## TAWNY FROGMOUTH.

*Podargus strigoides*, Latham.

*Caprimulgus strigoides*, Latham, Index Orni. Supp. (1801), p. LVIII.

Range—Tasmania and Australia.

Tasmanian form—*Podargus strigoides cuvieri*, Vigors and Horsfield, Trans. Linn. Soc. (1827), XV., p. 200.

Brownish grey, splashed white. Bill, legs and feet black. Rugged outline.

Dimensions—Length, 460 mm. Bill, 27 mm. Wing, 263 mm. Tail, 205 mm. Tarsus, 35 mm.

Nest and Eggs—Nest of twigs. Eggs (2) white (48 mm. x 33 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume II., pl. 4. Mathews, Birds of Australia, Volume VII., pls. 325 and 326.

The Tawny Frogmouth is generally called "More Pork," owing to the prevalent idea that this species makes the call which is so typical of the evening hours in the bush. As a matter of fact the little spotted Owl makes this cry. There is some evidence, however, which would go to show that this species may occasionally mimic the call of the owl. He is a good mimic in other ways, for when sitting lengthways along a dead limb it needs a practised eye to discern the bird. Although nocturnal in habit, this species is far removed from the Owl family.

## OWLET NIGHTJAR.

*Aegotheles cristata*, White.

*Caprimulgus cristatus*, White, Journ. Voy. N.S.W. (1790), p. 241.

Range—Tasmania and Australia, and islands to the North.

Greyish black. Faint collar. Under paler. Bill black. Legs and feet yellowish.

Dimensions—Length, 235 mm. Bill, 10 mm. Wing, 135 mm. Tail, 120 mm. Tarsus, 23 mm.

Nest and Eggs—Nest in hole in tree. Eggs (3-4) white (26 mm. x 21 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume II., pl. 1. Mathews, Birds of Australia, Volume VII., pl. 330.

In certain localities, once their haunts are discovered, this species may be found to be fairly common. Its small size and nocturnal habits result in it often not being seen by the casual observer.



NLS R. Shorland Photo

Spotted Pardalote ( ) (*Pardaliparus punctatus*)



M. S. R. Shorland Photo

Young Pallid Cuckoo and foster parent - Black-headed Honeyeater (*M. affinis*).



## BROAD-BILLED ROLLER ("Dollar Bird").

*Eurystomus orientalis*, Linn.*Coracias orientalis*, Linn. Syst. Nat. (1766), XII., p. 159.

Range—Tasmania (accidental), Australia, and through the islands to India.

Tasmanian form—*Eurystomus orientalis pacificus*, Latham, Index. Orn. Supp. (1801), p. XXVII.

Head and upper dark brown. Wing marked blue, with lighter distinctive patch. Under bluish green. Bill and feet red.

Dimensions—Length, 277 mm. Bill, 23 mm. Wing, 190 mm. Tail, 90 mm. Tarsus, 21 mm.

Nest and Eggs—Nests in hole in tree. Eggs (3-5) white (35 mm. x 27 mm.).

References—Gould, Birds of Australia, Volume II., pl. 17. Mathews, Birds of Australia, Volume VII., pl. 331.

A specimen of this species was shot on the West Coast of Tasmania, and forwarded to the Tasmanian Museum.

## BLUE KINGFISHER.

*Alcyon azurea*.*Alcedo azurea*, Latham, Index Orn. Supp., p. XXXII. (1801).

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Alcyon azurea diemenensis*, Gould, P.Z.S. (1846), p. 19.

Upper blue. Wings black. Throat whitish. Under brownish.

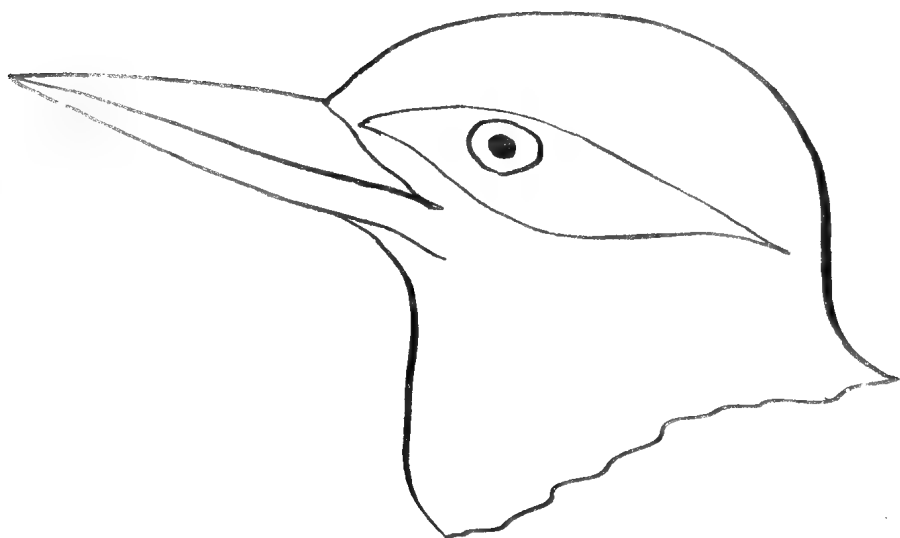
Dimensions—Length, 180 mm. Bill, 47 mm. Wing, 73 mm. Tail, 33 mm. Tarsus, 10 mm.

Nest and Eggs—Nest in tunnel in bank. Eggs (5-7) white (24 mm. x 19 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume II., pl. 25. Mathews, Birds of Australia, Volume VII., pl. 332.

This species is by no means common, but occasionally is met with along the banks of the less frequented rivers. The rich blue colouration of the head serves immediately to identify it.

## SACRED KINGFISHER.

*Halcyon sanctus*, Vigors & Horsfield*Halcyon sanctus*, Vig. & Hors., Trans. Linn. Soc., XV., p. 206.

Range—Tasmania, Australia, and islands to the North.

Crown of head and back green. White collar. Under buff. Bill black. Feet brownish red.

Dimensions—Length, 210 mm. Bill, 40 mm. Wing, 90 mm. Tail, 57 mm. Tarsus, 12 mm.

Nest and Eggs—Nest in hole in tree trunk. Eggs (4-5) white (25 mm. x 21 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume II., pl. 21. Mathews, Birds of Australia, Volume VII., pl. 339.

The beautiful greenish blue plumage of the Sacred Kingfisher is rather a rare sight along the Tasmanian river banks.

## SPINE-TAILED SWIFT.

*Chaetura caudacuta*, Latham.*Hirundo caudacuta*, Latham, Index. Orn. Supp. (1801), p. LVII.

Range—Tasmania and Australia, migrating North to Siberia and Japan.

Short spine tail. Black patch in front of eye. Forehead and throat white. Wings and tail greenish purple. Back brown. Bill, legs and feet blackish.

Dimensions—Length, 210 mm. Bill, 7 mm. Wing, 205 mm. Tail, 53 mm. Tarsus, 16 mm.

Nest and Eggs—Nests in Japan.

References—Gould, Birds of Australia, Volume II., pl. 10. Mathews, Birds of Australia, Volume VII., pl. 347.

The Spine-tailed Swift is but a summer visitor, though well known on account of the extraordinary speed it attains in the air. Such observers as Mr. Stuart Dove connect the appearance of Swifts with the advent of atmospheric disturbances. Certain observations of ours tend to support this view.

### WHITE-RUMPED SWIFT.

*Micropus pacificus*, Latham.

*Hirundo pacifica*, Latham, Index. Orn. Supp., p. 58.

Range—Tasmania, Australia, North to Japan, &c.

Long forked tail. White rump and throat, also faint collar. Upper dark brown. Under paler. Bill black. Legs and feet brownish.

Dimensions—Length, 181 mm. Bill, 7 mm. Wing, 175 mm. Tail, 80 mm. Tarsus, 12 mm.

Nest and Eggs—Nests Japan. Eggs (2) white.

References—Gould, Birds of Australia, Volume II., pl. 11. Mathews, Birds of Australia, Volume VII., pl. 348.

The White-rumped Swift is not as common as the Spine-tailed species, with which it often flies, and consequently its presence is overlooked, though the long forked tail is an unmistakable identification mark.

### ORDER CUCULIFORMES (Cuckoos, &c.).

The members of this order have as their main distinctive characteristics long wings and semi-paired feet.

Nearly all the Cuckoos in the world rely upon other birds to hatch their young. Many observers claim that the egg is laid on the ground, and transported from there in the bird's bill to the nest of the future foster parents. Upon hatching out the young Cuckoo soon overshadows in size the other occupants of the nest, and eventually thrusts them from the nest in order that he may obtain the full benefit of the food supply brought by the foster parents. It is rather an amusing sight to watch such a species as the Brown Tail endeavouring to supply the needs of a young cuckoo. The "baby" will be much larger than the foster parents, and his demand for food seems insatiable, the small birds being kept continuously at work bringing food for the single young occupant of the nest, and also carrying away any debris, for such birds as the Brown Tail keep their nests as clean as possible, and carry away from the nest any loose droppings, etc., of the young.

## PALLID CUCKOO.

*Cuculus pallidus*, Latham.*Columba pallida*, Latham, Index. Orn. Supp. (1801), p. LX.

Range—Tasmania and Australia.

Head, neck and under greyish brown. Upper brown. Tail barred white. Bill black. Legs and feet yellow.

Dimensions—Length, 335 mm. Bill, 20 mm. Wing, 200 mm. Tail, 175 mm. Tarsus, 21 mm.

Nest and Eggs—Egg palish pink, sparingly dotted red (24 mm. x 17 mm.). Nests September to December.

References—Gould, Birds of Australia, Vol. IV., pl. 85. Mathews, Birds of Australia, Vol. VII., pl. 350.

The Pallid Cuckoo is a true herald of spring, and those who are used to the calls of the bush experience a thrill of pleasure when the first calls of the Pallid Cuckoo are heard running up the chromatic scale. This usually occurs about August, but there are earlier records for some seasons.

## FAN-TAILED CUCKOO.

*Cacomantis flabelliformis*, Latham.*Cuculus flabelliformis*, Latham, Index. Orn. Supp. (1801), II., p. 30.

Range—Tasmania and Australia.

Head and upper dark grey. Wings and tail brownish. White streak on shoulder. Under pale rufous. Bill black. Feet yellowish.

Dimensions—Length 270 mm. Bill, 16 mm. Wing, 142 mm. Tail, 135 mm. Tarsus, 20 mm.

Egg—Egg white, spotted brown and faint purple (22 mm. x 16 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume IV., pl. 86. Mathews, Birds of Australia, Volume VII., pl. 351.

The Fan-tailed Cuckoo is easily distinguished by its fan-shaped tail, which is moved up and down when the bird perches for a few moments.

## NARROW-BILLED BRONZE CUCKOO.

*Chalcites basalis*, Horsfield.*Cuculus basalis*, Horsfield, Trans. Linn. Soc., XIII., p. 179.

Range—Tasmania, Australia, and islands to the North.

Head bronze brown. Whitish mark over eye. Upper bronze green. Under buff, barred bronze brown. Tail barred brown and white.

Dimensions—Length, 160 mm. Bill, 11 mm. Wing, 100 mm. Tail, 72 mm. Tarsus, 17 mm.

Egg—Egg pinkish, dotted brown and red (18 mm. x 13 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume IV., pl. 89. Mathews, Birds of Australia, Volume VII., pl. 355.

The Narrow-billed Bronze Cuckoo differs from the Bronze Cuckoo in having a narrower bill, but the general appearance is very similar.

## BROAD-BILLED BRONZE CUCKOO (Shining Bronze Cuckoo).

*Lamprococyx lucidus*, Gmelin.

*Cuculus lucidus*, Gmelin, Syst. Nat., p. 421 (1788).

Range—Tasmania, Eastern Australia, New Zealand.

Bill broader than *C. basilus*. Crown of head shining green. Forehead with white mark. Under barred bronze green.

Dimensions—Length, 165 mm. Bill, 13 mm. Wing, 10.5 mm. Tail, 65 mm. Tarsus, 15 mm.

References—Buller, Birds of New Zealand, pl. 15 (1888). Mathews, Birds of Australia, Vol. VII., pl. 356.

This species, which is the common Bronze Cuckoo of New Zealand, is met with occasionally in Tasmania. Considerable research yet needs to be done by field workers with regard to the migrations and habits of the species of Cuckoos met with in the island.

## GREEN BRONZE CUCKOO.

*Lamprococyx plagosus*, Latham

*Cuculus plagosus*, Latham, Index Orn. Supp., p. XXXI. (1801).

Range—Tasmania, Australia, and islands to the North.

Tasmanian form *Lamprococyx plagosus tasmaniensis*, Mathews, Aust. Avian. Record (1912), I., p. 17.

Upper bronze colour, crown brown. Tail bronze, with black band at top. Under whitish, barred deep bronze. Bill, legs and feet blackish.

Dimensions—Length, 160 mm. Bill, 13 mm. Wing, 102 mm. Tail, 70 mm. Tarsus, 15 mm.

Egg—Egg greenish bronze brown (17 mm. x 12 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume IV., pl. 89. Mathews, Birds of Australia, Volume VII., pl. 357.

The Bronze Cuckoo is very similar in general appearance to the Narrow-billed Cuckoo, and it is often difficult in the bush exactly to distinguish the species. The eggs of the two species, however, are entirely different.

## CHANNEL BILL.

*Scythrops novæ-hollandiæ*, Latham.

*Scythrops nova-hollandiæ*, Latham, Index. Orn (1790), I., p. 141.

Upper grey. Tail black, tipped white. Under white. Bill (very large) horn colour. Feet brown.

Dimensions—Length, 650 mm. Bill, 90 mm. Wing, 350 mm. Tail, 275 mm. Tarsus, 40 mm.

Egg—Egg white, dotted pinkish brown (46 mm. x 30 mm.).

References—Gould, Birds of Australia, Volume IV., pl. 90. Mathews, Birds of Australia, Volume VII., pl. 361.

The Channel Bill, which, on account of its size and the particularly large bill, may be recognised easily, is but an accidental visitor to Tasmania.

## ORDER PASSERIFORMES (Perching Birds).

The *Passeriformes*, or Perchers, constitute an enormous order, the number of species being more than three-fifths of the total known forms of birds in the world. All the members of the order are specialised for perching, in having three toes in front and one behind. Another characteristic of the order is that the greater majority of the species have their vocal organs well adapted for song.

As far as Tasmania is concerned, if we include the Sea Birds, the proportion of Perching Birds falls below the world proportion, but this is only to be expected in an island such as ours. If we omit the Sea Birds the proportion becomes very large.

## BLACK AND WHITE FANTAIL.

*Rhipidura leucophrys*, Latham.

*Rhipidura leucophrys*, Latham, Supp. Index Orn., Vol. II., p. XLV. (1801).

Range—Tasmania (accidental) and Australia.

Head, neck, throat, and upper surface black, white mark above eye. Wings brown. Under whitish.

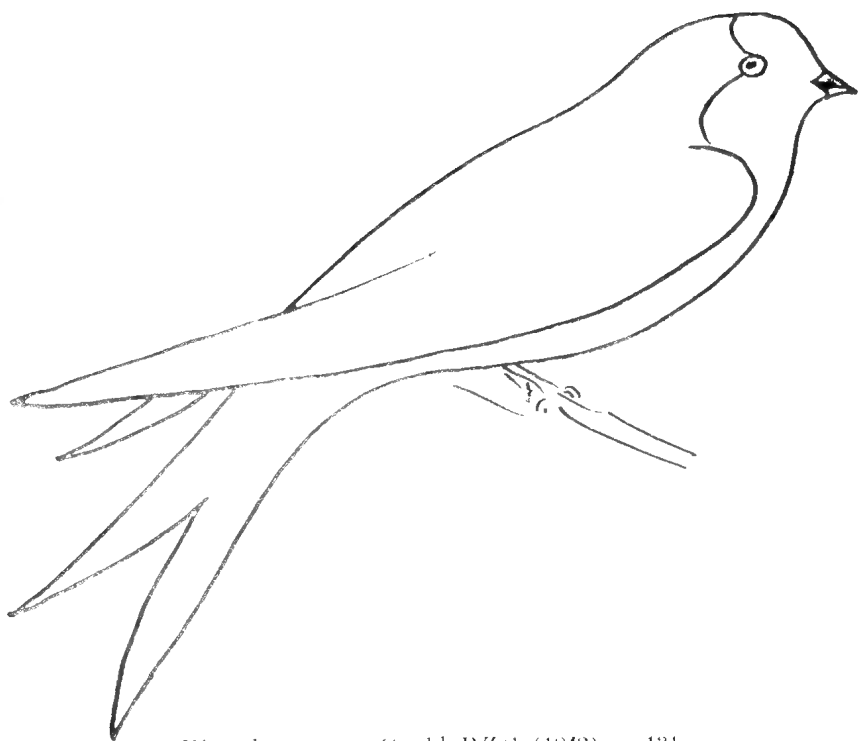
Dimensions—Length, 190 mm. Bill, 12 mm. Wing, 90 mm. Tail, 93 mm. Tarsus, 25 mm.

Nest and Eggs—Nest of bark, cup shaped. Eggs (3-4) cream coloured.

References—Gould, Birds of Australia, Volume II., pl. 86. Mathews, Birds of Australia, Volume IX., pl. 404.

The Black and White Fantail, commonly known on the mainland as the Willie Wagtail, is but an occasional visitor to the island.

## WELCOME SWALLOW.

*Hirundo neoxena*, Gould.*Hirundo neoxena*, Gould, P.Z.S. (1842), p. 131.

Range—Tasmania and Australia, migrating North.

Head and back shining blue. Reddish band on forehead. Tail and wings blackish brown. Under pale brown. Rump dark brown. Bill, legs and feet black. Tail forked.

Dimensions—Length, 148 mm. Bill, 7 mm. Wing, 110 mm. Tail, 75 mm. Tarsus, 10 mm.

Nest and Eggs—Nest of mud and grass. Eggs (4) whitish, dotted brown and purple (18 mm. x 14 mm.). Nests September to February.

References—Gould, Birds of Australia, Volume II., pl. 13. Mathews, Birds of Australia, Volume VIII., pl. 374.

The Welcome Swallow is a migratory species, although a few pairs often stay in Tasmania all the year round. The general body of the migrants usually arrives in Tasmania in August, and leaves about the end of March or beginning of April. Observations made in Hobart showed that swallows returned on the 23rd of August for several years in succession. The mud nests of this species are to be seen in many places, and there is a widespread superstition among country dwellers against interfering with their nests.

## TREE MARTIN (Tree Swallow).

*Hylochelidon nigricans*, Vieillot.*Hirundo nigricans*, Vieillot, Nov. Diet. d'Hist. Nat. (1817), XIV., p. 523.

Range—Tasmania and Australasia, migrating North.

Tasmanian form—*Hylochelidon nigricans nigricans*, Vieillot.

Head and upper surface blue. Rump whitish brown. Reddish band on forehead. Under pale brown. Rump whitish. Bill, legs and feet brown.

Dimensions—Length, 133 mm. Bill, 7 mm. Wing, 110 mm. Tail, 53 mm. Tarsus, 11 mm.

Nest and Eggs—Nest in hollow of tree. Eggs (3-5) whitish, spotted reddish brown (17 mm. x 13 mm.). Nests September to January.

References—Gould, Birds of Australia, Volume II., pl. 14. Mathews, Birds of Australia, Volume VIII., pl. 375.

The Martins usually arrive in September or October, and remain until March or April. Whereas the Welcome Swallow builds a well constructed mud nest, the Martin is content to utilise a suitable hollow in a tree, and lay its eggs without much effort at nest building. Tree Martins are often mistaken for swallows, but the whitish rump of the Martin serves to distinguish it.

## FAIRY MARTIN.

*Hylochelidon ariel*, Gould.*Collocalia ariel*, Gould, Birds of Aust., Vol. II., p. 15.

Range—Tasmania (occasional visitor), East and South Australia.

Head reddish. Back black. Rump and under white.

Dimensions—Length, 117 mm. Bill, 6 mm. Wing, 95 mm. Tail, 40 mm. Tarsus, 10 mm.

Nest and Eggs—Long bottle-shaped nest of sand. Built in colonies under cliffs, sides of houses, etc. Eggs (4-5) white, occasionally faintly marked.

References—Gould, Birds of Australia, Volume II. Mathews, Birds of Australia, Vol. VIII., pl. 375.

The Fairy Martin is but an occasional visitor to the North and Eastern Coasts of Tasmania.

## LEADEN FLYCATCHER.

*Myiagra rubecula*, Latham.*Todus rubecula*, Latham, Index. Orni. Supp (1801), p. XXXII.

Range—Tasmania, Australia, and New Guinea.

Upper lead colour, tinged green. Under tail and breast white. Bill, legs and feet blackish. Female has breast tinged reddish.

Dimensions—Length, 160 mm. Bill, 11 mm. Wing, 80 mm. Tail, 75 mm. Tarsus, 16 mm.





(continued on next page)

Tension Flux in



Al. S. R. Sharland Photo

Dusky Wood Swallow (*Aimophila cooperi*)

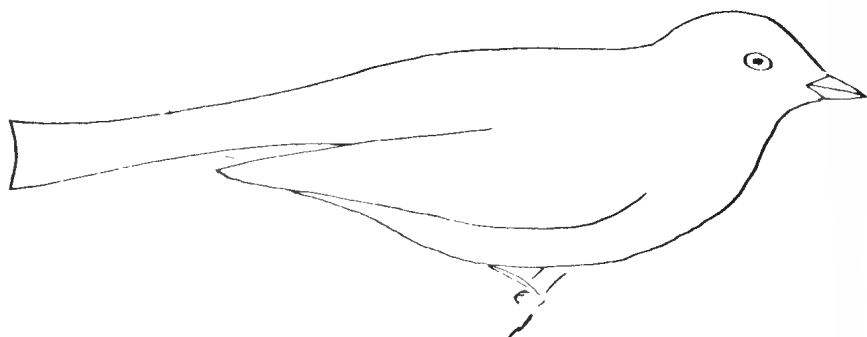
Nest and Eggs—Nest of bark and cobwebs. Eggs (3) white, spotted greyish purple (17 mm. x 14 mm.). Nests November to January.

References—Gould, Birds of Australia, Volume II., pl. 89. Mathews, Birds of Australia, Volume IX., pl. 405. Pap. & Proc. Roy. Soc. Tas. Monthly Notices, 1874, p. 10.

The Leaden Flycatcher is a migratory species, and as far as our observations go is not common. Occasional pairs may be seen in certain localities during the spring and summer months. The first record for this species in Tasmania was made by Colonel Legge in a paper read before the Royal Society of Tasmania on the 10th March, 1874.

### SATIN FLYCATCHER.

*Myiagra cyanoleuca.*



*Platynhynchos cyanoleuca*, Vieillot, Nouv. Diet. d'Hist. Nat. (1818), Vol. XXVII., p. 11.

Range—Tasmania, South and Eastern Australia.

Upper and throat velvety greenish black. Under white. Bill, legs and feet blackish. Female has reddish breast.

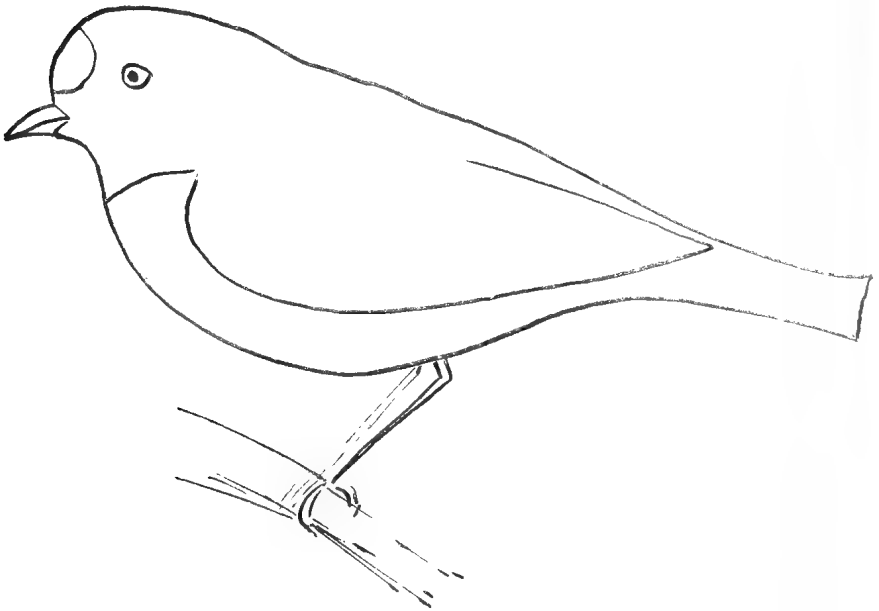
Dimensions—Length, 170 mm. Bill, 15 mm. Wing, 87 mm. Tail, 80 mm. Tarsus, 17 mm.

Nest and Eggs—Nest of bark and cobwebs. Eggs (2-3) white, spotted purplish (19 mm. x 14 mm.). Nests November to January.

References—Gould, Birds of Australia, Volume II., pl. 91. Mathews, Birds of Australia, Volume IX., pl. 406.

The Satin Flycatcher is a migratory form very similar to the preceding species, but is met with more often. Both this and the Leaden Flycatcher nest usually at the end of a projecting branch, where they are consequently very difficult to find and even more difficult to examine in detail.

## SCARLET-BREASTED ROBIN.

*Petroica multicolor*, Vigors & Horsfield.*Muscicapa multicolor*, Vigors & Horsfield, Trans. Linn. Soc., XV., p. 243.

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Petroica multicolor leggi*, Sharp, Cat. Birds Brit. Mus., IV., p. 165 (1879).

Breast scarlet. Throat black. Forehead white. Upper black, tipped white on wings. Under grey. Female brownish with faint markings. Breast pale scarlet. Bill, legs and feet black.

Dimensions—Length, 145 mm. Bill, 10 mm. Wing, 72 mm. Tail, 53 mm. Tarsus, 17 mm.

Nest and Eggs—Nest of bark and moss. Eggs (3-4) greenish, blotched purplish (17 mm. x 13 mm.). Nest September to December.

References—Gould, Birds of Australia, Volume III., pl. 3. Mathews, Birds of Australia, Volume VIII., pl. 377.

The Scarlet-breasted Robin is one of the best known Tasmanian birds. The white frontal patch and black throat serve to distinguish it from the Flame-breasted species. In common with the other Robins, it has a habit of flicking its wings when perched.

## FLAME-BREASTED ROBIN.

*Petroica phœnicea (chrysoptera)*, Gould.

*Petroica phœnicea*, Gould, P.Z.S. (1836), IV., p. 105.

Range—Tasmania, South and Eastern Australia.

Breast and entire throat vermilion red. Upper brownish black. Small white spot on forehead. Under whitish. Female brown, white marks on wings. Bill, legs and feet black.

Dimensions—Length, 145 mm. Bill, 10 mm. Wing, 77 mm. Tail, 55 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of bark and moss. Eggs (3-4) whitish, blotched purple (17 mm. x 13 mm.). Nests September to December.

References, Gould, Birds of Australia, Volume III., pl. 6. Mathews, Birds of Australia, Volume VIII., p. 378.

The Flame-breasted Robin may be identified immediately by the vermilion colouration of the breast, which is carried up the throat, and does not cease on the chest, as is the case with the Scarlet-breasted species.

## PINK-BREASTED ROBIN.

*Erythrodicus rodinogaster*, Drapez.

*Saxicola rodinogaster*, Drapez, Ann. Sci. Phy. Brux. (1819), II., p. 341.

Range—Tasmania and South-Eastern Australia.

Chest and abdomen magenta pink. Small white spot on forehead. Upper slatish. Female brown. Bill, legs and feet black.

Dimensions—Length, 125 mm. Bill, 10 mm. Wing, 65 mm. Tail, 50 mm. Tarsus, 17 mm.

Nest and Eggs—Nest of moss. Eggs (3-4) greenish, spotted purplish (19 mm. x 14 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume III., pl. 1. Mathews, Birds of Australia, Volume VIII., pl. 378.

The Pink-breasted Robin, seen in its natural surroundings amidst the ferns of some hillside gully, is undoubtedly the gem of the Tasmanian avifauna. It is very quiet in habit, and unless one is used to its ways it will remain unnoticed amidst the undergrowth. It is generally to be found along the creek beds in the denser gullies. The beautiful cup-shaped nest, usually lichen covered, is in keeping with the general characteristics of the bird.

## DUSKY ROBIN.

*Amaurodryas vittata*, Quoy and Gaimard.

*Muscicapa vittata*, Quoy and Gaim., Voy. de l'Australabl. (1830), pl. 3.

Range—Tasmania (including Bass Straits Islands).

Tasmanian form—*Amaurodryas vittata*, Q. & G.

Upper brown, with dull white mark down centre of wings. Under greyish. Bill, legs and feet black.

Dimensions—Length, 155 mm. Bill, 12 mm. Wing, 87 mm. Tail, 60 mm. Tarsus, 25 mm.

Nest and Eggs—Nest of roots, bark, etc. Eggs (3-4) green, marked brown (21 mm. x 15 mm.). Nests August to December.

References—Gould, Birds of Australia, Volume III., pl. 8. Mathews, Birds of Australia, Volume VIII., pl. 380.

The Dusky Robin frequents open timbered country, and is of a quiet disposition. It builds a nest of twigs in the stump of a tree. It will readily feign a broken wing in order to lead an intruder away from its nest. Two other sub species have been described by Mathews (Aust. Av. Rec., II., p. 92) *A.v. kingi*, from King Island, which has a buff breast, and *A.v. bassi* from Cape Barren Island on account of its darker colouration generally.

## DUSKY FANTAIL (Grey Fantail).

*Rhipidura flabellifera*, Gmelin.

*Muscicapa flabellifera*, Gmelin, Syst. Nat. (1789), p. 943.

Range—Tasmania (including Bass Straits Islands), Australia, etc.

Tasmanian form—*Rhipidura flabellifera albiscopa*, Gould, P.Z.S. (1840), p. 113.

Upper sooty black. Throat and tail feathers white. Under buff grey. Bill, legs and feet black.

Dimensions—Length, 155 mm. Bill, 7 mm. Wing, 70 mm. Tail, 80 mm. Tarsus, 15 mm.

Nest and Eggs—Nest of fine bark, cobwebs, etc. Eggs (3-4) whitish, spotted (15 mm. x 10 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume II., pl. 83. Mathews, Birds of Australia, Volume IX., pl. 400-401.

The Dusky Fantail is generally known as the "Cranky Fan." The initial cause of such nomenclature was evidently the fan-shaped tail of the bird (when flying), and also the erratic gyrations of its flight. It is fairly common along the timbered creeks, where it usually builds its characteristic nest with a wine-glass like stem, overhanging the water.

## GOLDEN-BREASTED WHISTLER

*Pachycephala pectoralis*, Latham.*Muscicapa pectoralis*, Latham, Index. Orn. Supp. (1801), p. LI.

Range—Tasmania (including Bass Straits Islands).

Tasmanian form—*Pachycephala pectoralis glauca*, Gould, P.Z.S. (1845), p. 19.

Head and band on breast black. Upper greyish. Tail grey. Throat white. Back of neck and under marked yellow. Female brown. Bill black. Legs and feet brown.

Dimensions—Length, 175 mm. Bill, 12 mm. Wing, 100 mm. Tail, 85 mm. Tarsus, 25 mm. Female smaller.

Nest and Eggs—Nest of bark. Eggs (2-3) yellowish, spotted purplish (24 mm. x 17 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume II., pl. 65. Mathews, Birds of Australia, Volume VIII., pl. 391.

The Whistlers or "Thickheads," as they are often termed, constitute one of the joys of the Tasmanian bush. On a spring morning in a mountain gully it is a delight to hear the ringing notes of the Whistlers echoing through the timber. The nest of this species usually may be recognised by the fact that it is built upon a foundation of several leaves, those of musk being often chosen for this purpose. Also known as the Grey-tailed or White-throated Whistler.

## OLIVE WHISTLER.

*Pachycephala olivacea*, Vigors & Horsfield.*Pachycephala olivacea*, Vig. & Hors., Trans. Linn. Soc. (1827), XV., p. 241.

Range—Tasmania and South-Eastern Australia.

General plumage olive greyish brown. Throat and under surface paler. Bill black. Legs and feet brownish.

Dimensions—Length, 205 mm. Bill, 12 mm. Wing, 100 mm. Tail, 90 mm. Tarsus, 30 mm.

Nest and Eggs—Nest of bark. Eggs (3-4) yellowish, blotched reddish purple (29 mm. x 21 mm.). Nests September to December.

References—Gould, Birds of Australia, Volume II., pl. 73. Mathews, Birds of Australia, Volume VIII., pl. 396.

The Olive Whistler, or Olivaceous Thickhead, frequents denser and more mountainous country than the Golden-breasted species. Whilst nowhere very common, it is distributed fairly evenly, and a few generally may be seen during a day's walk on Mount Wellington.

## WHISTLING SHRIKE THRUSH (Grey Shrike Thrush).

*Colluricincla harmonica*, Latham.*Turdus harmonicus*, Latham, Index. Orn. Supp. (1801), p. XLI.

Range—Tasmania and South-Eastern Australia.

General plumage grey. Under paler. Bill, legs and feet black.

Dimensions—Length, 255 mm. Bill, 25 mm. Wing, 130 mm. Tail, 100 mm. Tarsus, 30 mm.

Nest and Eggs—Nest of bark. Eggs (2-4) white, blotched purplish brown (28 mm. x 20 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume II., pl. 77.

The "Whistling Dick," as the species is called by bushmen, is one of the best known Tasmanian forms, and is well distributed over the island. Its melodious notes as they ring through the timber on a spring morning are a source of delight to those whose duty or pleasure takes them into the bush.

## MAGPIE LARK.

*Grallina cyanoleuca*, Latham.

*Corvus cyanoleucus*, Latham, Index, Orn. Supp. (1801), p. XXV.

Range—Tasmania (accidental) and Australia.

Black and white. Upper black, with patches of white. Under white. Chest black.

Dimensions—Length, 290 mm. Bill, 20 mm. Wing, 190 mm. Tail, 120 mm. Tarsus, 40 mm.

Nest and Eggs—Nest of mud. Eggs (3-4) white, spotted reddish purple (27 mm. x 19 mm.).

Reference—Gould, Birds of Australia, Volume II., pl. 54.

The Magpie Lark can be classed only as an accidental visitor as far as Tasmania is concerned.

## BLACK-FACED CUCKOO SHRIKE ("Summer Bird").

*Graucalus nova-hollandiæ*, Gmelin.

*Turdus nova-hollandiæ*, Gmelin, Syst. Nat. (1787), p. 814.

Range—Tasmania (including Bass Straits Islands), Australia, and islands to the North.

Forehead, neck and throat black. Upper grey. Under greyish white. Bill black. Legs and feet brown.

Dimensions—Length, 320 mm. Bill, 25 mm. Wing, 190 mm. Tail, 150 mm. Tarsus, 25 mm.

Nest and Eggs—Nest of twigs and bark. Eggs (3-4) dark green, blotched umber (31 mm. x 21 mm.). Nests October to December.

References—Gould, Birds of Australia, Volume II., pl. 55. Mathews, Birds of Australia, Volume IX., pl. 413.

This species is generally known throughout Tasmania as the Summer Bird. As far as we can gather it is only semi-migratory, flocking to certain districts to breed. Even then it will not always return to the same district the next year. It has a peculiar habit of "shrugging" its wings alternately while perched, and a characteristic undulating flight.



## WHITE-SHOULDERED CATERPILLAR EATER.

*Campophaga tricolor*, Swainson.*Cecblepyris tricolor*, Swain., Zool, Jm. (1825), I., p. 467.

Range—Tasmania, Australia, and New Guinea.

Distinctive white shoulder on black wing. Upper black. Throat and under white. Bill, legs and feet blackish. Female brownish.

Dimensions—Length, 180 mm. Bill, 12 mm. Wing, 100 mm. Tail, 75 mm. Tarsus, 22 mm.

Nest and Eggs—Nest of twigs and grass. Eggs (2-3) greenish, blotched umber (44 mm. x 40 mm.).

References—Gould, Birds of Australia, Volume II., pl. 63. Mathews, Birds of Australia, Volume IX., pl. 418.

The White-shouldered Caterpillar Eater is an occasional visitor to the Northern Coasts of Tasmania. The distinctive white shoulder on the wing, together with its musical song-like notes, serve as a ready means for identification of this species.

## SPOTTED GROUND BIRD.

*Cinclosoma punctatum*, Shaw.*Turdus punctatus*, Shaw, Zoo. N.H. (1794), pl. 9.

Range—Tasmania, South and Eastern Australia.

Tasmanian form *Cinclosoma punctatum dovei*, Mathews, Nov. Zool. (1912) XVIII., p. 330.

Head and neck brown, lined black. Shoulders black, spotted white. Under greyish, spotted. Bill black. Legs and feet whitish.

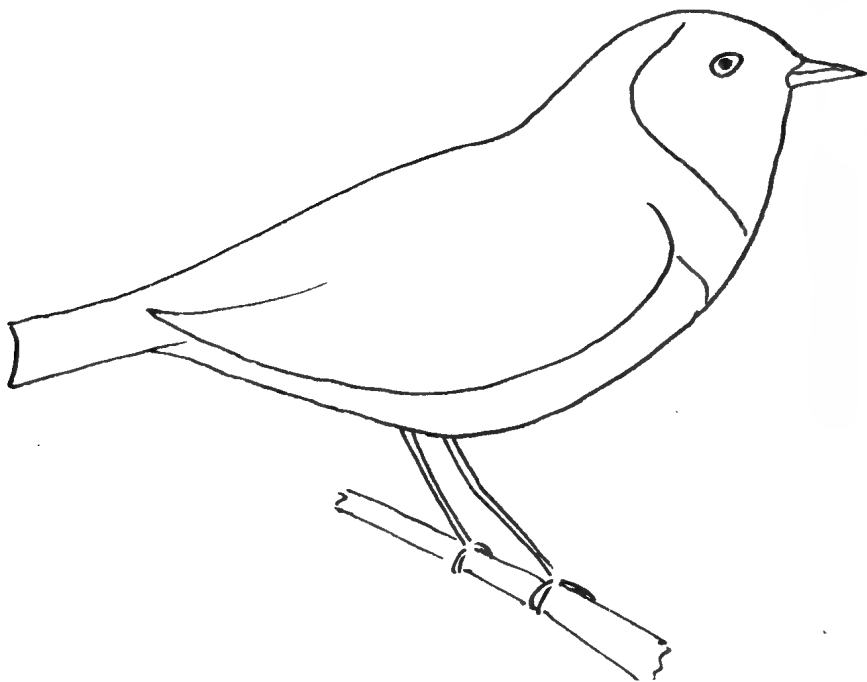
Dimensions—Length, 265 mm. Bill, 18 mm. Wing, 115 mm. Tail, 120 mm. Tarsus, 33 mm.

Nest and Eggs—Nest on ground, constructed of bark and coarse grass. Eggs (2-3) white, spotted purplish (36 mm. x 24 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume IV., pl. 4. Mathews, Birds of Australia, Volume IX., pl. 423.

The Spotted Ground Bird is of a rather retiring disposition, and often is not noted by casual observers. Along grassy, lightly timbered hill sides the bird may be observed in many districts, but like most ground birds it is decreasing gradually as settlement advances. It is more often heard than seen, and its distinctive soft whistle-like note (which is much like that of the Mountain Thrush) serves as a ready means of ascertaining if the species frequents a locality. It is often referred to as the "Ground Dove."

## WHITE-FRONTED CHAT.

*Epthianura albifrons*, Jardine & Selby.*Acanthiza albifrons*, Jard. & Selb., Ill. Orn. (1828), II., p. 56.

Range—Tasmania and Australia.

Tasmanian form—*Epthianura albifrons tasmanica*, Mathews.

Front and under white. Black band on chest. Back ash grey. Wings and tail black. Bill, legs and feet black.

Dimensions—Length, 125 mm. Bill, 12 mm. Wing, 67 mm. Tail, 40 mm. Tarsus, 15 mm.

Nest and Eggs—Nest of grass, in tussock. Eggs (3-4) white, spotted reddish (17 mm. x 13 mm.). Nests August to November.

References—Gould, Birds of Australia, Volume III., pl. 64. Mathews, Birds of Australia, Volume IX., pl. 439.

The White-fronted Chat is semi-migratory in habit, and wanders from district to district in search of food. Open grassy country or around the edges of lagoons and waterholes are its favourite haunts.

## LARGE BILLED GROUND THRUSH ("Mountain Thrush").

*Oreocincla lunulata*, Latham.*Turdus lunulatus*, Latham, Index. Orn. Supp. (1801), p. XLII.

Range—Tasmania and South-Eastern Australia.

Tasmanian form—*Oreocincla lunulata macrorhyncha*, Gould, Syn. Birds of Aust. (1838), IV., pl. 3.

Upper olive brown, mottled with black. Under paler, with black markings. Bill, legs and feet brown.

Dimensions—Length, 300 mm. Bill, 25 mm. Wing, 140 mm. Tail, 110 mm. Tarsus, 35 mm.

Nest and Eggs—Nest of moss and grass. Eggs (2-3) green, blotched dull reddish (36 mm. x 22 mm.). Nests June to October.

References—Gould, Birds of Australia, Volume IV., pl. 7. Mathews, Birds of Australia, Volume IX., pl. 438.

The Mountain or Fern Thrush is to be met with in most gullies and amidst the moist undergrowth of the bush at the higher elevations; in the myrtle and sassafras forests, where it feeds largely upon land snails, which it has a habit of cracking on a particular stone. Along the Pack Track in the National Park (Mount Field) can be seen many of these stones surrounded by pieces of the cracked shells of land snails. It is very quiet in disposition, and when disturbed flies for a short distance amid the undergrowth, and then resumes its search for food among the fallen leaves, etc.

## TASMANIAN THORNBILL (Ewing's Warbler).

*Acanthiza ewingi*, Gould.*Acanthiza ewingi*, Gould, Birds of Australia (1848), III., pl. 55.

Range—Tasmania (including Bass Straits Islands).

Tasmanian form—*Acanthiza ewingi ewingi*.King Island form—*Acanthiza ewingi zupifrons*, Campbell, Emu (1903), II., p. 203.

Forehead rufous. Upper olive brown. Tail olive brown. Throat grey. Under whitish. Bill, legs and feet brown.

Dimensions—Length, 100 mm. Bill, 11 mm. Wing, 50 mm. Tail, 50 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of grass, etc. Eggs (3-4) pinkish white, freckled reddish (17 mm. x 12 mm.). Nests September to December.

Reference—Littler, Birds of Tasmania, p. 36.

Ewing's *Acanthiza* may be classed as the scrub form of the common "Brown tail." It frequents both the scrub fringing the gullies and the undergrowth of the forests at fairly high altitudes. Its nest may be distinguished from the Brown tail owing to its more compact form.

## BROWN THORNBILL (Brown-tailed Warbler).

*Acanthiza pusilla*, White.*Motacilla pusilla*, White, Jrn. Voy. N.S.W. (1790), p. 257.

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Acanthiza pusilla diemenensis*, Gould, Syn. Birds Aust. (1838), pl. 59.

Brown. Forehead rufous. Upper olive. Tail blackish. Under greyish white, streaked black. Tail brown. Bill, legs and feet brown.

Dimensions—Length, 102 mm. Bill, 11 mm. Wing, 53 mm. Tail, 45 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of grass, etc. Eggs (3-4) pinkish white, freckled red (17 mm. x 12 mm.). Nests August to December.

References—Gould, Birds of Australia, Volume III., pl. 54. Mathews, Birds of Australia, Volume IX., pls. 447, 448.

This common *Acanthiza* is to be met with in most localities suitable for its habits open or semi-forest country being the most favoured situations. It is generally known as the "Brown Tail."

## YELLOW-TAILED WARBLER.

*Geobasilus chrysorrhoas*, Quoy and Gaimard.*Saxicola chrysorrhoa*, Quoy & Gaim., Voy. de l'Astrolabe (1830), p. 198.

Range—Tasmania and Australia.

Tasmanian form—*Geobasilus chrysorrhoas leachi*, Mathews, Nov. Zool. (1912), XVIII., p. 351.

Rump and tail coverts yellow. Forehead black. Throat and line over eye whitish. Upper brown. Under greyish. Bill, legs and feet brownish.

Dimensions—Length, 105 mm. Bill, 10 mm. Wing, 60 mm. Tail, 45 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of grass, etc. Eggs (3-4) white, sometimes spotted (18 mm. x 12 mm.). Nests July to December.

References—Gould, Birds of Australia, Volume III., pl. 63. Mathews, Birds of Australia, Volume IX., pl. 452.

The Yellow-tail is one of the best known of our smaller birds, and is common in most localities. During the winter numbers congregate in flocks, and may be seen amid the grassy open paddocks searching for food. This species usually nests early, when it constructs a dome-shaped nest, which often has a false cup-shaped cavity woven on top.



M. S. R. Sheppard Photo  
Frogmouth on nest, on top of stump.



M. S. R. Sharland Photo

Black-faced Cuckoo Shrike ("Summer Bird").

## SCRUB TIT.

*Acanthornis magna*, Gould.*Acanthiza magna*, Gould, Birds of Australia Supp. (1855) p. 28.

Range—Tasmania.

Head and upper dark brown. Throat and under greyish white. Bill, legs and feet blackish brown.

Dimensions—Length, 111 mm. Bill, 14 mm. Wing, 57 mm. Tail, 52 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of grass, bark, etc. Eggs (3-4) white, blotched reddish (18 mm. x 12 mm.). Nests October to December.

Reference—Gould, Birds of Australia Supplement, pl. 28.

This species is an inhabitant of the scrub, and owing to its retiring disposition is often not seen by the casual observer. In certain localities, however, they appear to be fairly plentiful within small areas suited to their mode of life.

## BROWN SCRUB WREN.

*Sericornis humilis*, Gould.*Sericornis humilis*, Gould, Syn. Birds of Australia (1838), pl. 58.

Range—Tasmania (including Bass Straits Islands).

Tasmanian form—*Sericornis humilis humilis*.Flinders Island form—*Sericornis humilis flindersi*, White & Mellor, Emu (1913), XII., p. 166.

Olive brown. White spot on wing. Under surface paler. Bill, legs and feet brown.

Dimensions—Length, 125 mm. Bill, 15 mm. Wing, 63 mm. Tail, 54 mm. Tarsus, 25 mm.

Nest and Eggs—Nest of leaves, grass, etc. Eggs (3-4) magenta-buff, blotched umber (21 mm. x 16 mm.). Nests August to November.

Reference—Gould, Birds of Australia, Volume III., pl. 47.

The Brown Scrub Wren is, as its name implies, an inhabitant of the scrub, where it spends its time hopping about amidst the undergrowth in search of its insect food. The nest is built usually under the overhanging leaves of a sag along the banks of a creek or amidst the scrub, and in such localities is exceedingly difficult to find. Note the sub-specific differences in the Flinders Island, Kent Group, etc., forms of this species.

## STRAITED FIELD WREN.

*Calamanthus fuliginosus*, Vigors & Horsfield.*Anthus fuliginosus*, Vig. & Hors. Trans. Linn. Soc. (1827), XV., p. 230.

Range—Tasmania and South-Eastern Australia.

Upper brown, lined black. Under greyish white, streaked black. Bill, legs and feet brownish black.

Dimensions—Length, 140 mm. Bill, 10 mm. Wing, 55 mm. Tail, 55 mm. Tarsus, 23 mm. Female smaller.

Nest and Eggs—Nest of grass, etc. Eggs (3-4) reddish or purplish brown (20 mm. x 15 mm.). Nests August to December.

References—Gould, Birds of Australia, Volume III., pl. 70. Mathews, Birds of Australia, Volume IX., pl. 434.

The Straited Field Wren is to be found usually in semi-swampy tussocky grass country. It keeps well to the ground, and does not fly any great distance when flushed. Its upturned tail serves as a ready means of identification.

## LITTLE GRASS BIRD.

*Megalurus gramineus*, Gould.

*Sphenæus gramineus*, Gould, P.Z.S. (1845), XIII., p. 19.

Range—Tasmania and Australia.

Upper brown, streaked black. Under grey. Tail reddish brown. Bill, legs and feet brown.

Dimensions—Length, 150 mm. Bill, 12 mm. Wing, 57 mm. Tail, 60 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of grass. Eggs (3-4) whitish, spotted reddish grey (17 mm. x 14 mm.).

Reference—Gould, Birds of Australia, Volume III., pl. 36.

The Grass Bird is an inhabitant of the tussocks where it collects its food, which consist mainly of insects. It is very shy, and when disturbed flies just above the ground for a short distance.

## AUSTRALIAN REED WARBLER.

*Acrocephalus australis*, Gould.

*Acrocephalus australis*, Gould, Birds of Australia (1848), III., p. 37.

Range—Tasmania, South-Eastern Australia, also Lombok.

Upper olive brown. Under buff. Throat white. Bill, legs and feet brown.

Dimensions—Length, 160 mm. Bill, 15 mm. Wing, 80 mm. Tail, 70 mm. Tarsus, 25 mm.

Nest and Eggs—Nest in reeds. Eggs (3-4) greyish, darker markings (20 mm. x 14 mm.). Nests September to January.

Reference—Gould, Birds of Australia, Volume III., pl. 37.

This migratory species is an inhabitant of the reed beds along the river banks. It is noted particularly for the sweetness of its songs.

As far as Tasmania is concerned the Reed Warbler appears to be more plentiful in the North than in the South.

The Reed Warbler was not recorded in Tasmania until April, 1875, when it was observed on the North Esk, and was later found breeding.



## GRASS WARBLER.

*Cisticola exilis*, Vigors & Horsfield.*Malurus exilis*, Vig. & Hors. Trans. Linn. Soc. (1827), XV., p. 223.

Range—Tasmania, Australia, north to Asia.

Upper golden brown, streaked black. Throat and under whitish. Tail (long) blackish buff. Bill, legs and feet brownish.

Nest and Eggs—Nest of grass. Eggs (3-4) bluish green, blotched brown (15 mm. x 11 mm.).

References—Gould. Birds of Australia, Volume III., pl. 42. Mathews, Birds of Australia, Volume IX., pl. 443. The Emu, Volume XII. (1913), p. 171.

The Grass Warbler frequents grassy flats. It is common on King Island, but its occurrence in Tasmania proper was first drawn attention to by Miss J. A. Fletcher in 1913 (The Emu, Vol. XII., p. 171).

## EMU WREN.

*Stipiturus malachurus*, Shaw.*Muscicapa malachura*, Shaw, Trans. Linn. Soc. (1798), IV., p. 242.

Range—Tasmania and Australia.

Tasmanian form—*Stipiturus malachurus littleri*, Mathews, Nov. Zoo. (1912), p. 362.

Distinctive long bristle-like tail feathers. General colour brown. Bill, legs and feet brown.

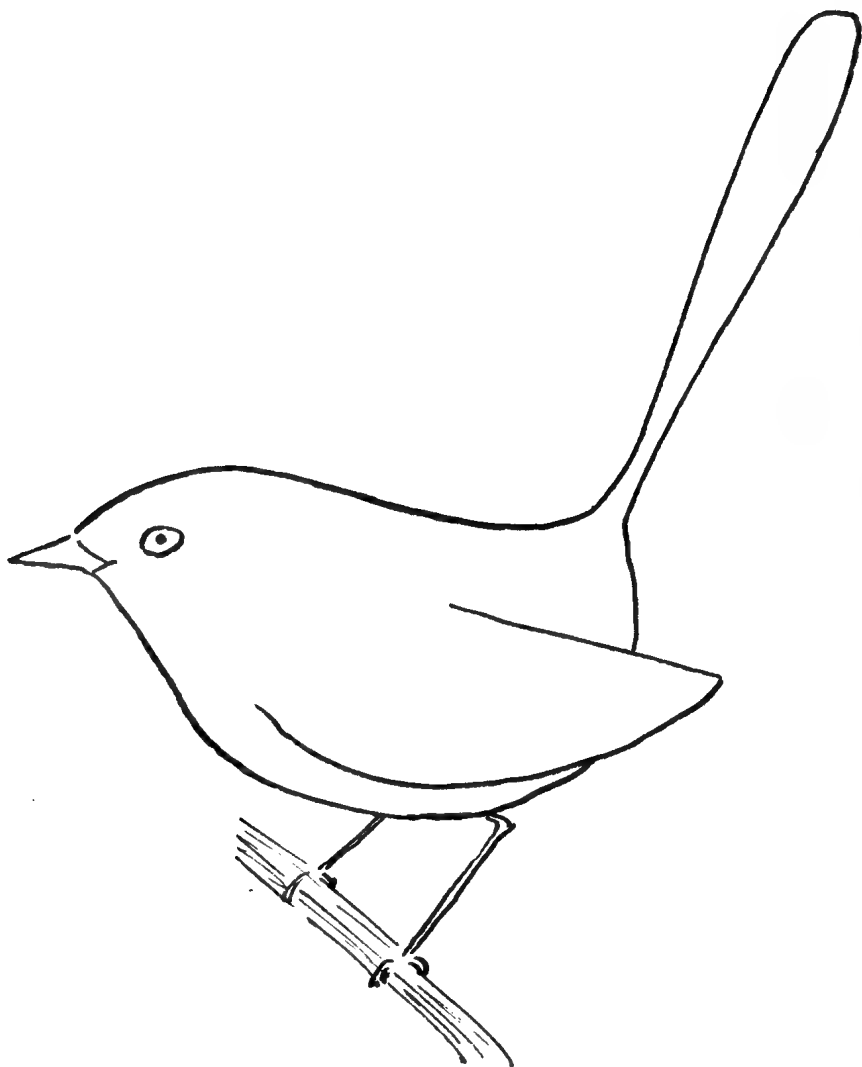
Dimensions—Length, 165 mm. Bill, 7 mm. Wing, 45 mm. Tail, 100 mm. Tarsus, 18 mm.

Nest and Eggs—Nest of grass, etc. Eggs (3-4) white, brownish markings (17 mm. x 12 mm.). Nests September to November.

Reference—Gould, Birds of Australia, Volume III., pl. 31.

The Emu Wren, which can be distinguished immediately by its small size and bristle-like tail feathers, is by no means a common bird as far as Tasmania as a whole is concerned. In certain localities where there are open marshy plains covered with tussock grass the species may be met with. Its flight is very weak, and it usually climbs to the top of a tussock in order to "take off," but soon returns to the ground, which it is loath to leave.

## BLUE WREN.

*Malurus cyaneus*, Gmelin.*Motacilla cyanea*, Gmelin, Syst. Nat. (1789), p. 991.

Range—Tasmania, South and Eastern Australia.

Tasmanian forms — Southern Tasmanian Blue Wren, *Malurus cyaneus cyaneus*, Gmelin. Northern Tasmanian Blue Wren, *Malurus cyaneus fletcheræ*, Mathews, Aust. Av. Rec. (1912), I., p. 93. King Island Blue Wren, *Malurus cyaneus elizabethæ*, Campbell, Ibis (1891), p. 10. Flinders Island Blue Wren, *Malurus cyaneus samueli*, Mathews, Aust. Av. Rec. (1912), I., p. 93.

Crown of head and crescent on back blue. Upper black. Under greyish. (Breeding plumage.) Female brownish. Bill black. Legs and feet brown.

Dimensions—Length, 130 mm. Bill, 10 mm. Wing, 55 mm. Tail, 63 mm. Tarsus, 25 mm.

Nest and Eggs—Nest of grass, etc. Eggs (3-4 white, with reddish markings (18 mm. x 12 mm.)). Nests September to December.

Reference—Gould, Birds of Australia, Volume III., pl. 19.

The Blue Wren is one of the best known Tasmanian birds, as it not only inhabits the bush, but is one of the species which still remain round the more closely settled areas, in spite of the toll levied on its numbers by that greatest enemy of bird life, the domestic cat.

## WOOD SWALLOW.

*Artamus cyanopterus*, Latham.

*Loxia cyanoptera*, Latham, Index. Orn. Supp., p. XLVI. (1801).

Range—Tasmania and Australia.

Upper slate brown. Tail tipped white. Wings edged white. Under brownish grey. Bill bluish. Legs and feet brownish.

Dimensions—Length, 173 mm. Bill, 14 mm. Wing, 123 mm. Tail, 70 mm. Tarsus, 15 mm.

Nest and Eggs—Nest of bark and twigs. Eggs (2-4) white, blotched purplish brown (20 mm. x 15 mm.)). Nests September to January.

Reference—Gould, Birds of Australia, Volume II., pl. 27.

The Wood Swallow is usually considered a strictly migrating bird, but we have noted it with young in the nest as late as March. In certain districts it may be classed among the most common of the species inhabiting the timbered country.

## BROWN TREECREEPER.

*Climacteris picumna*, Temm.

*Climacteris picumna*, Temm. & Lang., Planch. Color. d'Ois., 47 E., Vol. III., p. 281 (1824).

Range—Tasmania (?) and South-Eastern Australia.

Upper brown. Greyish line over eye. Throat white, spotted dark brown. Flanks striped white.

Nest and Eggs—Nest of grass, etc. Eggs (3) pinkish, spotted red.

Reference—Gould, Birds of Australia, Volume IV., pl. 93.

We have no personal observations concerning this species or the White-throated form in Tasmania, but reliable observers have assured us that these forms occur here.

## WHITE-THROATED TREECREEPER.

*Climacteris leucophæa*, Latham.*Certhia leucophæa*, Latham, Index. Orn. Supp. (1801), p. XXXVI.

Range—Tasmania and South-Eastern Australia.

Head and back brown. Throat white. Flanks brown, streaked white. Bill, legs and feet blackish brown.

Dimensions—Length, 145 mm. Bill, 15 mm. Wing, 80 mm. Tail, 60 mm. Tarsus, 17 mm.

Nest and Eggs—Nest of bark. Eggs (3) white, blotched reddish.

Reference—Gould, Birds of Australia, Volume IV., pl. 98.

This species has appeared provisionally on several Tasmanian lists, and recently it was reported to us that this species had been found nesting in the Lake district. We have no personal observations, however.

## YELLOW-TIPPED PARDALOTE.

*Pardalotus striatus*, Gmelin.*Pipra striata*, Gmelin, Syst. Nat. (1789), p. 1003.

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Pardalotus striatus striatus*.King Island form—*Pardalotus striatus kingi*, Mathews, Nov. Zool. (1912), XVIII., p. 387.

Head black, spotted white. Yellow spot on wing. Upper base of tail yellow. Throat yellow. Under buff. Bill black. Feet brown.

Dimensions—Length, 107 mm. Bill, 7 mm. Wing, 65 mm. Tail, 35 mm. Tarsus, 22 mm.

Nest and Eggs—Nest in hole in tree or bank. Eggs (4-5) white (18 mm, x 14 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume II., pl. 39.

This species, in common with the rest of the genus, is a small insect eating bird living a restless life amidst the timbered country. It is to be found usually amidst the branches of the eucalypts.

## FORTY SPOTTED PARDALOTE.

*Pardalotus quadragintus*, Gould.*Pardalotus quadragintus*, Gould, Syn. Birds Aust. (1838), IV., pl. 62.

Range—Tasmania (including King Island).

Upper brown. White spots on wings. Under greyish brown. Bill, legs and feet blackish brown.

Dimensions—Length, 100 mm. Bill, 7 mm. Wing, 63 mm. Tail, 35 mm. Tarsus, 20 mm.

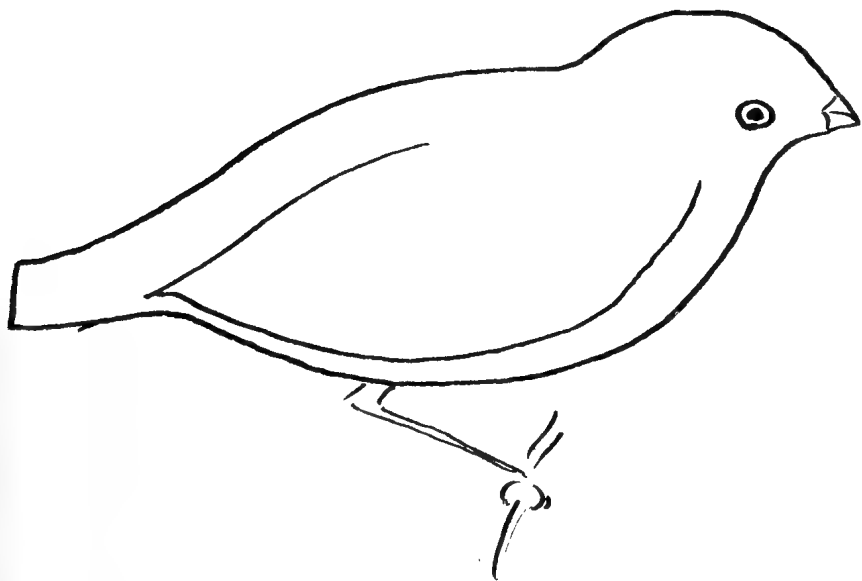
Nest and Eggs—Nest in hole in tree. Eggs (4) white (16 mm. x 13 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume II., pl. 37.

The Forty-spotted Pardalote is perhaps the rarest of the "Diamond Birds" which occur in Tasmania. Owing to its habits of living amidst the branches of the giants of the forests, often it is not seen by the casual observer. Also referred to as the Many-spotted Pardalote.

### SPOTTED PARDALOTE.

*Pardalotus punctatus*, Shaw & Nod.



*Pipra punctata*, Shaw & Nodd., Nat. Miscell., Vol. IV., pl. 3 (1792).

Range—Tasmania and Australia.

Tasmanian form—*Pardalotus punctatus leachi*, Mathews, Nov. Zool. (1912), XVIII., pl. 389.

Head and wings black, spotted white. Tail black, tipped white. Upper spotted brown. Base of tail scarlet above, yellow below. Throat yellow. Abdomen buff. Bill black. Feet brown.

Dimensions—Length, 95 mm. Bill, 7 mm. Wing, 60 mm. Tail, 35 mm. Tarsus, 15 mm.

Nest and Eggs—Nest of bark in tunnel in bank. Eggs (4-5) white (16 mm. x 13 mm.). Nests August to December.

Reference—Gould, Birds of Australia, Volume II, pl. 35.

The Spotted Pardalote, or Diamond Bird, is common in most localities suited to its mode of life. This beautiful species frequents both the low undergrowth and the topmost branches of the smaller eucalypts, particularly the latter in fairly open timbered country.

### GREY-BACKED SILVEREYE ("White Eye").

*Zosterops lateralis*, Latham.

*Sylvia lateralis*, Latham, Index Orn. Supp. (1801), pl. LV.

Range—Tasmania and Australasia.

Tasmanian form—*Zosterops lateralis tasmanica*, Mathews, Nov. Zool. (1912), XVIII., p. 385.

White ring round eye. General colour above glossy green. Under greyish. Bill black. Legs and feet brown.

Dimensions—Length, 105 mm. Bill, 10 mm. Wing, 62 mm. Tail, 40 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of horsehair, grass, etc. Eggs (3-4) bluish green (15 mm. x 11 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 81.

This species is to be seen often in small flocks in the vicinity of settlement. Small fruit growers notice the White Eye when the fruit is ripe, and look upon it as a pest, but the bird is in the orchards all the year round, and does a large amount of good eating the blight, aphids, etc.

### STRONG BILLED HONEYEATER.

*Melithreptus validirostris*, Gould.

*Hæmatops validirostris*, Gould, Syn. Birds Aust. (1837), I., pl. 17.

Range—Tasmania and King Island.

Head black. Neck banded white. Upper brownish. Throat white. Under greyish. Bill, legs and feet black.

Dimensions—Length, 160 mm. Bill, 17 mm. Wing, 80 mm. Tail, 70 mm. Tarsus, 22 mm.

Nest and Eggs—Nest of grass, bark, etc. Eggs (2-3) pinkish, spotted reddish (22 mm. x 17 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 70.

The white band round the head serves to distinguish this species from the "Black Cap," as both frequent the same kind of country. This bird shows considerable variety in the sites chosen for its nest. Sometimes the nest will be placed high up in a fairly large tree, whilst on other occasions it will be only a foot or so off the ground in a low scrub. Often quite a number will nest within quite a limited area.

## BLACK-HEADED HONEYEATER.

*Melithreptus affinis*, Lesson.*Eidopsarus affinis*, Lesson. *Revue Zool.* (1839), p. 167.

Range—Tasmania (including Bass Straits Islands).

King Island form—*Melithreptus affinis alsteri*, Mathews, B.O.C. (1909), XXV., p. 85.

Head black. Upper greyish brown. Under greyish white. Bill black. Legs and feet brown.

Dimensions—Length, 140 mm. Bill, 12 mm. Wing, 77 mm. Tail, 63 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of wool, moss, etc. Eggs (3) pinkish, spotted reddish purple (20 mm. x 14 mm.). Nests September to December.

Reference—Gould, *Birds of Australia*, Volume IV., pl. 75.

The familiar "Black Cap" is an inhabitant of the tall eucalypts, building its nest far aloft amidst swinging branches, and usually gathering its food from under the bark and amidst the blossoms and leaves of the taller trees.

## SPINE BILL HONEYEATER.

*Acanthorhynchus tenuirostris*, Latham.*Certhia tenuirostris*, Latham, *Index. Orni. Supp.* (1801), p. XXXVI.

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Acanthorhynchus tenuirostris dubius*, Gould, *Syn. Birds Aust.* (1837), II., pl. 27.

Bill very long. Throat white, marked brown. Upper brown. Tail black, tipped white. Head black. Bill, legs and feet black.

Dimensions—Length, 140 mm. Bill, 24 mm. Wing, 63 mm. Tail, 55 mm. Tarsus, 21 mm.

Nest and Eggs—Nest of bark, moss, etc. Eggs (2-3) purplish buff, spotted brown (20 mm. x 14 mm.). Nests September to December.

Reference—Gould, *Birds of Australia*, Volume IV., pl. 61.

The Spinebill or "Cobbler's Awl" is one of the most distinctive forms on account of its long spine-like bill. Amidst the low scrub or in the open heathy flats when the flowers are in bloom this species usually is to be seen, and may be recognised readily by the flash of white in its tail as it flies.

## TAWNY CROWNED HONEYEATER.

*Glyciphila melanops*, Latham.*Certhia melanops*, Latham, Index. Orn. Supp. (1801), XXXVI.

Range—Tasmania and Australia.

Tasmanian form—*Glyciphila melanops crassirostris*, Mathews, Nov. Zool. (1912), XVIII., p. 399.

Crown tawny. Upper brown. Black markings on cheeks. Under white. Bill, legs and feet brownish.

Dimensions—Length, 155 mm. Bill, 17 mm. Wing, 85 mm. Tail, 70 mm. Tarsus, 23 mm.

Nest and Eggs—Nest of bark, etc. Eggs (2-3) pinkish, spotted brown (20 mm. x 14 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 28.

The Tawny Crowned or Fulvous-fronted Honeyeater is not nearly as evenly distributed as most of the *Meliphagidæ* in Tasmania. In such localities as the sandy heaths on Bruny Island it is usually to be seen. In many districts it is quite unknown.

## YELLOW-THROATED HONEYEATER.

*Meliphaga flavicollis*, Vieillot.*Melithreptus flavicollis*, Vieillot, Nov. Dict. d'Hist. Nat. (1817). XIV., p. 325.

Range—Tasmania (including Bass Straits Islands).

Tasmanian form—*Meliphaga flavicollis flavicollis*, Vieillot.King Island form—*Meliphaga flavicollis flavigula*, Gould, Syn. Birds Aust. (1838), IV., pl. 72.

General colour olive yellow. Throat bright yellow. Bill, legs and feet brownish black.

Dimensions—Length, 200 mm. Bill, 20 mm. Wing, 100 mm. Tail, 102 mm. Tarsus, 25 mm.

Nest and Eggs—Nest of bark, grass, lined wool, etc. Eggs (2-3) whitish, spotted red brown (25 mm. x 17 mm.). Nests August to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 35.

The Yellow-throated Honeyeater is well-known on account of its general distribution, distinctive marking, and the loud nature of its varied notes. Especially in the breeding season these Honeyeaters can be heard calling at quite long distances, and they are among the last of the birds to cease their vocal exercises in the evening hours.



## CRESCENT HONEYEATER.

*Meliornis pyrroptera*, Latham.*Certhia pyrroptera*, Latham, Index Orn. Supp. (1801), p. XXXVIII.

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Meliornis pyrroptera inornata*, Gould, Lyn. Birds Aust. (1838), IV., pp., p. 5.

Throat white, with dark crescent on chest. Head and upper brown. Wings and tail marked bright yellow. Female duller. Bill, legs and feet black.

Dimensions—Length, 155 mm. Bill, 15 mm. Wing, 80 mm. Tail, 65 mm. Tarsus, 21 mm.

Nest and Eggs—Nest of bark, etc. Eggs (3-4) pinkish, spotted red brown (19 mm. x 14 mm.). Nests August to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 27.

The Crescent Honeyeater is by far the most common of the *Meliphagidæ* in Tasmania, and is to be found in all localities, from suburban gardens to far bush and from sea level to the summits of the mountains.

## YELLOW-WINGED (NEW HOLLAND) HONEYEATER.

*Meliornis nova-hollandiæ*, Latham.*Certhia nova-hollandiæ*, Latham, Index Orn., Vol. I., p. 296 (1790).

Range—Tasmania and South-Eastern Australia.

Tasmanian form—*Meliornis nova-hollandiæ canescens*, Latham, Index Orn. (1790), II., p. 553.

Throat and chest streaked black and white. Upper brown, with white markings. Wings and tail brown and yellow. Tail tipped white. Bill black. Legs and feet brownish.

Dimensions—Length, 175 mm. Bill, 20 mm. Wing, 85 mm. Tail, 80 mm. Tarsus, 23 mm.

Nest and Eggs—Nest of bark, etc. Eggs (2-3) pinkish, spotted red brown (20 mm. x 14 mm.). Nests August to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 23.

The Yellow-winged Honeyeater is similar in habit to the preceding species, but not as common. The mottled black and white plumage of the throat and chest serve immediately to distinguish the species, as also does its distinctive "chattering" note. Also known as the "New Holland" or White-bearded Honeyeater."

## NOISY MINER.

*Myzantha garrula*, Latham.*Merops garrulus*, Latham, Index. Orn. Supp., p. XXXIV. (1801).

Range—Tasmania, South and Eastern Australia.

Tasmanian form—*Myzantha garrula leachi*, Mathews, Nov. Zool. (1912), XVIII., p. 417.

Head black. General plumage grey. Neck and tip of wing and tail whitish. Bill, legs and feet yellow.

Dimensions—Length, 275 mm. Bill, 21 mm. Wing, 150 mm. Tail, 130 mm. Tarsus, 35 mm.

Nest and Eggs—Nest of twigs, etc. Eggs (3-4) pinkish, blotched red purple (27 mm. x 20 mm.). Nests August to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 76.

The Noisy Miner is well named, as its presence in any district is soon announced. Where it does occur it is usually to be found in fairly large numbers, but there are tracts of heavily timbered country wherein the garrulous callings of this species are never heard.

## BRUSH WATTLE BIRD.

*Anthochaera chrysoptera*, Latham.*Merops chrysopterus*, Latham, Index. Orn. Supp. (1801), p. XXXIII.

Range—Tasmania and Eastern Australia.

Dark brown, streaked white. Tail tipped white. Wattles absent. Bill black. Legs and feet brownish.

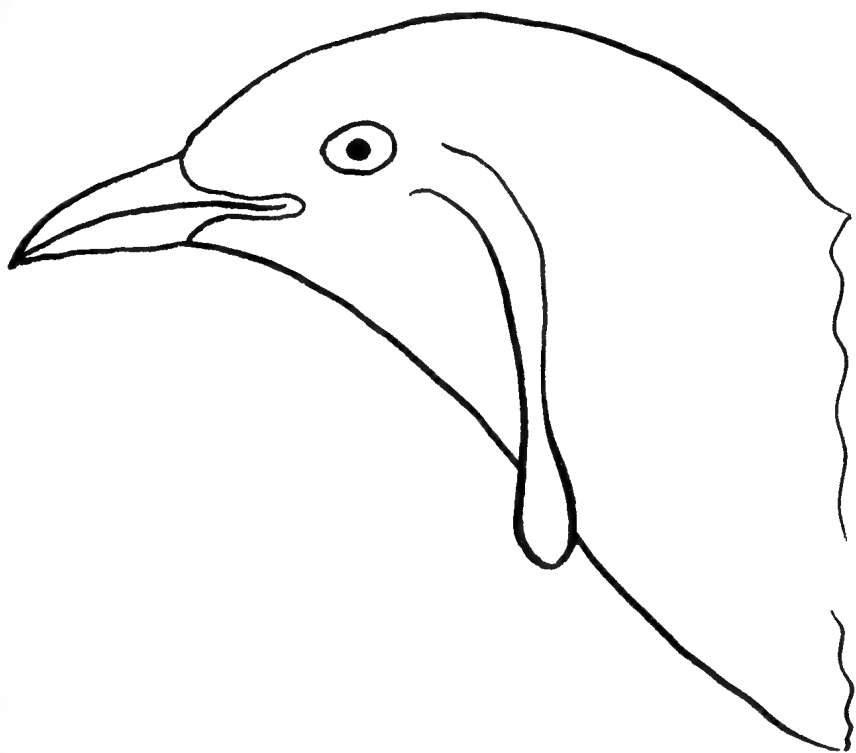
Dimensions—Length, 325 mm. Bill, 30 mm. Wing, 147 mm. Tail, 150 mm. Tarsus, 30 mm.

Nest and Eggs—Nest of twigs. Eggs (2-3) pinkish, blotched purplish and red.

Reference—Gould, Birds of Australia, Volume IV., pl. 56.

The Brush Wattle Bird may be heard usually before it is seen amidst the banksias or eucalpts, amongst which it gathers its food.

## YELLOW WATTLE BIRD.

*Anthochaera paradoxa.**Corvus paradoxus*, Daudin, Traite d'Orn. (1800), II., p. 246.

Range—Tasmania and King Island.

Brown, streaked white. Tail tipped white. Wattles yellow. Bill black. Legs and feet yellowish.

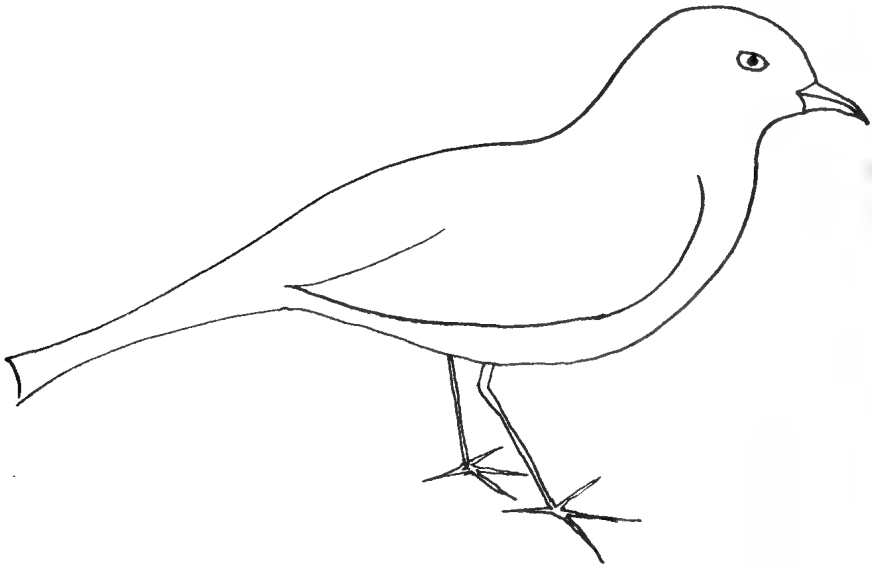
Dimensions Length, 425 mm. Bill, 25 mm. Wing, 180 mm. Tail, 250 mm. Tarsus, 45 mm.

Nest and Eggs Nest of twigs. Eggs (2-3) pinkish, blotched purplish and reddish brown (36 mm. x 24 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 54.

The large yellow wattles are the distinguishing features of this species. Its general habits are very similar to those of the Brush Wattle Birds. If one happens to be camped amidst the eucalpts when they are in flower, and there are wattle birds in the vicinity, there will not be much chance of sleep after the first pale streak of dawn. We write this in feeling memory of several nights on which our slumbers have been brought to an early conclusion.

## AUSTRALIAN PIPIT (Ground Lark).

*Anthus australis*, Vieillot.*Anthus australis*, Vieillot, Nouv. Dict. d'Hist. Nat. (1818), XXVI., p. 501.

Range—Tasmania and Australia.

Tasmanian form—*Anthus australis bistriatus*, Swainson, A.M.N.H. (1838), p. 316.

Upper streaked brown. Pale mark over eye. Under white, streaked brown. Bill blackish. Legs and feet brown.

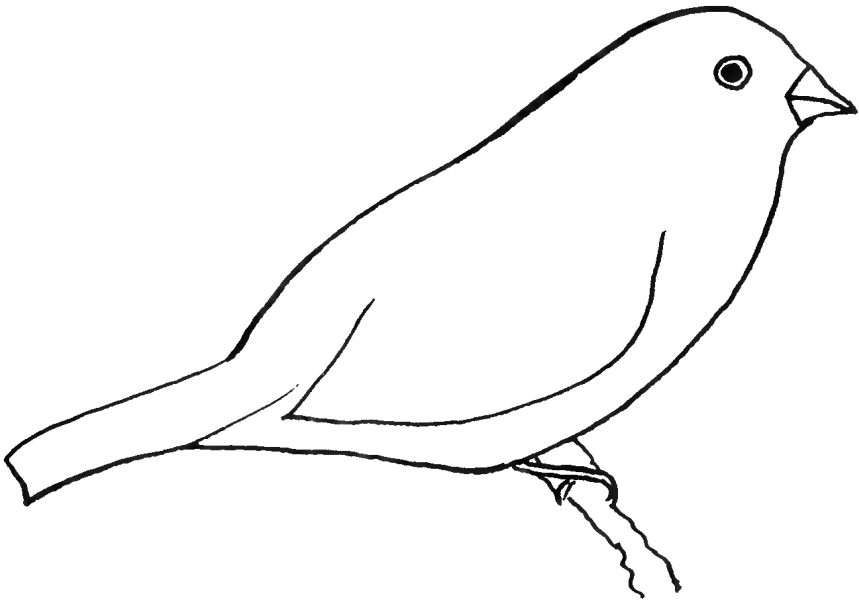
Dimensions—Length, 170 mm. Bill, 10 mm. Wing, 90 mm. Tail, 65 mm. Tarsus, 27 mm.

Nest and Eggs—Nest on ground. Eggs (3-4) greyish, spotted grey umber (23 mm. x 16 mm.). Nests August to December.

Reference—Gould, Birds of Australia, Volume III., pl. 73.

The Pipit or Ground Lark may be noted along the flats near the seashore or on the summits of the highest Tasmanian mountains (5000 feet above sea level). When disturbed it often runs for a short distance along the ground, and then remains motionless, its protective colouration rendering it difficult to see, although the flash of white in the tail, which is seen before it settles, assists in noting it, and also serves as an item of identification.

## BEAUTIFUL FIRETAIL (Fire-tailed Finch).

*Zonæginthus bellus*, Latham.*Loxia bella*, Latham, Index. Orn. Supp. (1801), p. XLVI.

Range—Tasmania and South-East Australia.

Upper brown. Under grey. Barred with white lines. Base of tail scarlet. Bill reddish. Legs and feet brownish.

Dimensions—Length, 125 mm. Bill, 12 mm. Wing, 57 mm. Tail, 47 mm. Tarsus, 17 mm.

Nest and Eggs—Nest of grass. Eggs (4-7) white (19 mm. x 12 mm.). Nests September to January.

Reference—Gould, Birds of Australia, Volume III., pl. 78.

The Firetail is well-known, and may be recognised immediately by the red patch at the base of the tail, and the barred nature of the plumage. This species is generally found in the thicker scrub of the gullies or amidst the forest country of the mountain ranges.

## AUSTRALIAN RAVEN ("Crow").

*Corvus coronoides*, Vigs. & Hors.*Corvus coronoides*, Vigers and Horsfield, Trans. Linn. Soc., Vol. XV., p. 261. (1827).

Range—Tasmania and Australia.

Entire plumage black. Base of feathers merges into grey. Bill, legs and feet black.

Dimensions—Length, 533 mm. Bill, 60 mm. Wing, 373 mm. Tail, 685 mm. Tarsus, 53 mm.

Nest and Eggs—Nest of sticks; etc. Eggs (4-5) various shades of green, blotched brown (42 mm. x 30 mm.). Nests August to December.

Reference—Gould, Birds of Australia, Volume IV., pl. 18.

The Raven is generally known in Tasmania as the "Crow." It is a common species, and met with in most localities.

## SPANGLED DRONGO.

*Chibia bracteata*, Gould.

*Dicrurus bracteatus*, Gould, P.Z.S. (1842), X., p. 132.

Range—Tasmania (accidental), South and Eastern Australia, and New Guinea.

General colour black, spangled green. Bill and legs black.

Dimensions—Length, 320 mm. Bill, 35 mm. Wing, 160 mm. Tail, 130 mm. Tarsus, 20 mm.

Nest and Eggs—Nest of roots, etc. Eggs (3-4) pinkish (31 mm. x 20 mm.).

Reference—Gould, Birds of Australia, Volume II., pl. 82.

The Drongo can but be classed as accidental or occasional visitor to Tasmania. The glossy black plumage, spangled with green and spotted white under the wings, serve to make this species a distinctive one.

## HILL BELL MAGPIE (Mountain Magpie).

*Strepera arguta*, Gould.

*Strepera arguta*, Gould, P.Z.S. (1846), XIV., p. 19.

General colour black. Under brownish. Markings on wings and tail white. Under tail coverts white. Bill, legs and feet black. Irides yellow.

Dimensions—Length, 535 mm. Bill, 68 mm. Wing, 293 mm. Tail, 260 mm. Tarsus, 68 mm.

Nest and Eggs—Nest of sticks. Eggs (3-4) buff, blotched brown (45 mm. x 30 mm.). Breeds September to December.

Reference—Gould, Birds of Australia, Volume II., pl. 44.

Amidst the highlands of Tasmania the "Black Mag," as it is commonly called, is well-known, and constitutes one of the permanent residents of the more alpine regions. It is also found in certain seasons along the coastal belts; for instance, when camped at Mussel Roe Bay, N.E. Tasmania, in May, 1923, this species was one of the most common in the district.

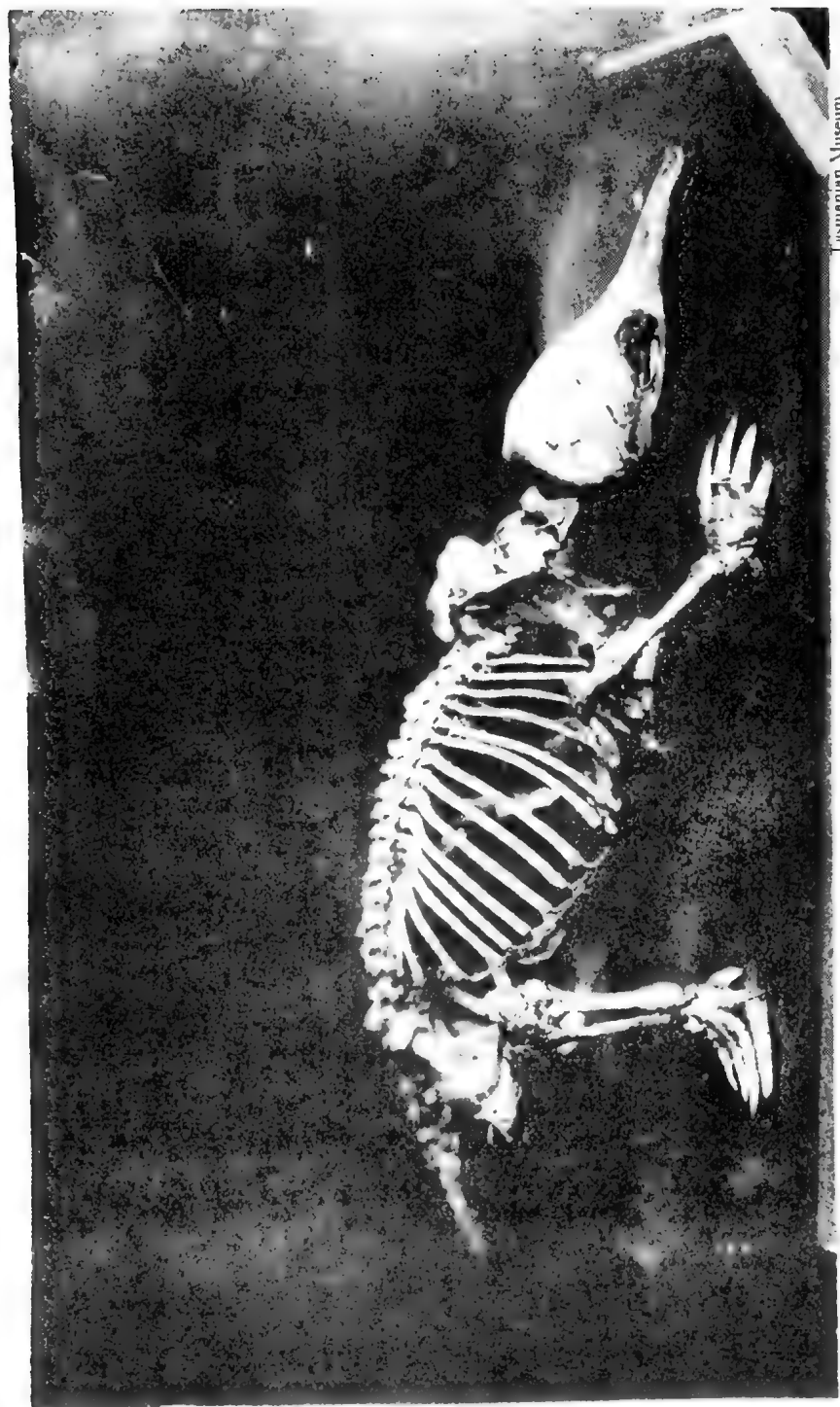
From life



STATION 30, AUGUST 1966, WILLOW

Echinidna.

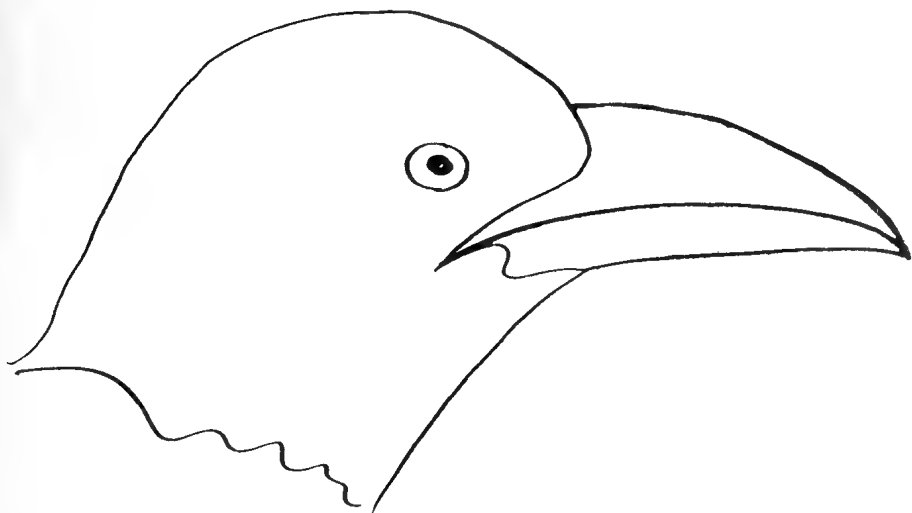
Clive Lord Photo



Skeleton of Echidna.



## BLACK BELL MAGPIE ("Black Jay")

*Strepera fuliginosa*, Gould.*Coronica fuliginosa*, Gould, Syn. Birds Aust. (1837), pt. I., pl. 5.

Range—Tasmania, South and East Australia.

Sooty black. End of primaries and end of tail white. Bill, legs and feet black. Irides yellow.

Dimensions—Length, 450 mm. Bill, 53 mm. Wing, 253 mm. Tail, 167 mm. Tarsus, 54 mm.

Nest and Eggs—Nest of sticks, etc. Eggs (2-4) dull purple, blotched brownish (44 mm. x 30 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume II., pl. 43.

The "Black Jay" is very similar as regards its general habits to the preceding species, and generally frequents the same localities. It may be distinguished from the mountain magpie by its smaller size, the arched bill, and the absence of the white patch under base of tail.

## BUTCHER BIRD ("Jackass").

*Cracticus torquatus*, Latham.*Lanius torquatus*, Latham, Index. Orn. Supp. (1801), p. XVIII.

Range—Tasmania and Australia.

Tasmanian form—*Cracticus torquatus cinereus*, Gould, Syn. Birds Aust. (1837), I., pl. II.

Head, back of neck, and part wings black. Upper grey. Under greyish white. Bill bluish. Feet black.

Dimensions—Length, 327 mm. Bill, 38 mm. Wing, 157 mm. Tail, 125 mm. Tarsus, 33 mm.

Nest and Eggs—Nest of twigs. Eggs (3-4) vary buff to green, spotted reddish purple (32 mm. x 23 mm.). Nests September to December.

Reference—Gould, Birds of Australia, Volume II., pl. 52.

The Butcher Bird or "Jackass," as it is commonly called in Tasmania, is generally distributed throughout the island. It is very fierce in the nesting season, when its liquid notes are to be heard often among the lightly timbered tracts at the head of the gullies.

### LESSER WHITE-BACKED MAGPIE.

*Gymnorhina hypoleuca*, Gould.

*Cracticus hypoleucus*, Gould, Syn. Birds Aust. (1837), I., pl. IV.

Range—Tasmania.

Black and white. Head and part back white. Under tail white. Rest black. Bill bluish. Legs and feet black.

Dimensions—Length, 363 mm. Bill, 43 mm. Wing, 242 mm. Tail, 144 mm. Tarsus, 53 mm.

Nest and Eggs—Nest of sticks and twigs. Eggs (3-4) green, marked umber (37 mm. x 25 mm.). Nests August to December.

Reference—Gould, Birds of Australia, Volume II., pl. 48.

The Magpie is a prominent member of the Tasmanian Avifauna, being fairly conspicuous in most districts. Whereas most of the Tasmanian birds, being insular forms, are slightly larger than the corresponding mainland species, the magpie is smaller.

### OSTEOLOGY OF BIRDS.

The skeleton of a bird furnishes a beautiful osteological study. The ossific tissue itself is the most compact of that found in any member of the vertebrate order, and yet withall the lightest and whitest example of bone available to us. Penetrated by pneumatic foramina, to enable warm air to circulate into the shafts of the bones and arms and legs—even into the very ribs themselves—the avian skeleton manifests the ideal conditions for flight. Living at a temperature high enough to mean death to a man, the bird of flight most truly of all vertebrates deserves the name of "warm blooded." To retain this abnormal heat, evolved by a high rate of oxygenation, the creature is clad in a padded coat of clinging, almost fur-like body feathers, surmounted by an outer plumage of equally wonderful structure.

The mechanics of birds' skeleton will well repay the time spent upon its investigation, and those who have devoted most study to it are loudest in their admiration for its completeness.

The neck is long, and yet capable of every variety of motion without the slightest fear of dislocation. Its real base is a solid block of vertebræ welded together to form the so-called syn-sacrum, but between the neck and the syn-sacrum come the slightly elastic block of dorsal vertebræ—a lovely sequence of graduation in the reduction of a high rate of motion. Of the keel-like sternum, enlarged for muscular attachment, the hinged ribs, with their guides, or epipleural processes, and the wonderful construction of the scapular girdle, and the beautiful poise of the wing bones, a book might be written and still leave their complete evolution unexhausted. The arrangement for elevating the beak by means of the quadrate and a springy bar of bone is a mechanical solution of the highest order, and never fails to excite the admiration of those who view it.

A comparative study of several complete avian skeletons, selected from various parts of the avian faunal realm are needed to truly appreciate the variations (of the great main type) that are incident upon habit and environment.

Even a dozen birds skulls will form a foundation for such an osteological research, and the marvel is so few ever bother with their collection and subsequent examination.

## MAMMALS.

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Mammals are the highest of the vertebrates, and Man himself is at the head of the Mammals.

They derive their designation from the characteristic Mammæ which are possessed by all the species of the class, except, in a limited sense, the Monotremes, which have mammary glands in place of the fully developed mamma. Mammals possess certain characteristics in common, such as the fact that all (with the exception of certain sloths, etc.) have seven servical vertebræ, or bones of the neck. All the mammalia representatives have a certain amount of hair on their bodies, even whales possess a few at least. Except in the case of these cetaceans (where rudiments have been formed in the fœtus) the extremities of the fingers and toes are covered with nails, claws, or hoofs.

The Marsupium or marsupial pouch, although looked for as a distinctive characteristic of the Marsupial group, also occurs in more or less rudimentary form in some of the higher animals. It is functional only in the *Marsupialia* and *Monotremata*.

In the Marsupials the young are born in the usual manner and transferred to the pouch or marsupium by the mother. The young are then in a very minute state, but instantly grasp the mamma in their mouths. The ends of the mamma then expand, and it is difficult to separate the young from the mamma until the former are well developed. The pouch is used as a resting place for the young for a considerable period. We draw attention to the above characteristics of the marsupials at this early stage for the reason that a very large percentage of the animals of our island State belong to the Sub-class of the Marsupials. Again, the method of birth is still a vexed question with the bushman, who will argue for hours around the camp fire in favour of his inherited theory that the young of the Marsupials are born in the pouch, and grow on the mamma! In the Monotremata (*Tachyglossus*) the pouch, except in the breeding season, resembles merely a fold of the skin, while in *Phascogale* the pouch is only present in a rudimentary form.

To return, however, to the general characterisation of the class. The variety of size is at once apparent when we recall the giant whales of the ocean and the minute opossum mice of our forests are both members of this group. Mention of the foregoing naturally brings the habitat of the various species under review, and we recall that mammals may be either terrestrial or aquatic, while some take to flying. The terrestrial mammals show a marked diversity of life within their group, for it may include such climbers as the phalangiers (the so-called Australian "Opossums"), burrowers as the wombats, running animals such as the bandicoots or leaping animals such as the kangaroos. The aquatic mammals may also claim diversity if we include the platypus in this group for we can then compare it with the whales. As far as Tasmania is concerned the flying mammals are naturally restricted to bats, unless we include the Lesser Flying Opossum (*Petaurus*), which does not fly, but merely volplanes from tree to tree. This is not strictly a Tasmanian animal, however, but was introduced in 1825.

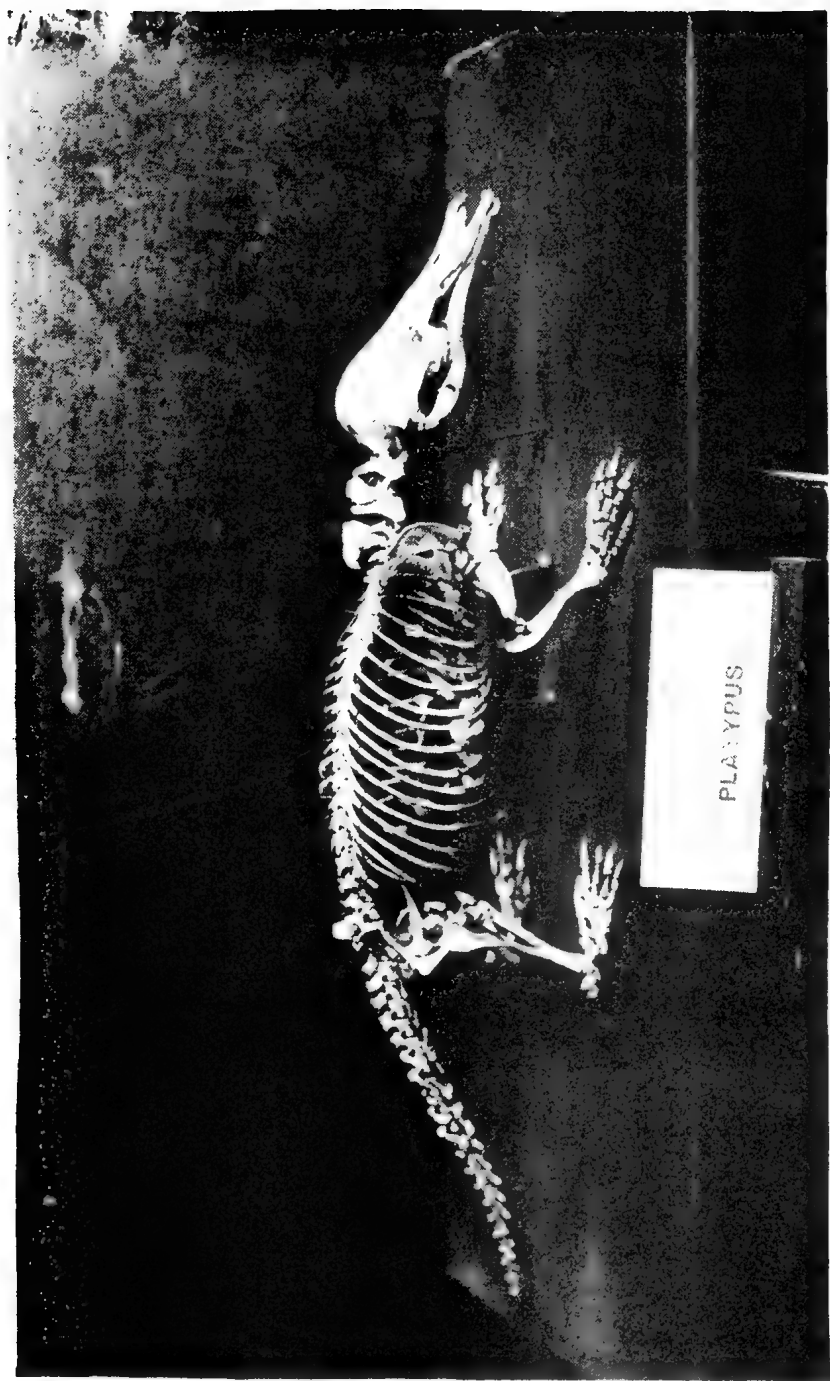
### CLASS MAMMALIA (Mammals).

Warm blooded vertebrates, breathing air by means of lungs. Skin more or less hairy. Skull jointed to the backbone by means of two condyles. Eggs minute, developing within female, which possesses milk glands for nourishment of young.



Platypus  
in its natural habitat

H. Burrell, C.M.Z.S., Photo



Tasmanian Museum

Skeleton of Platypus

SUB-CLASS III. *MONOTREMATA* (Monotremes).

Lowest and most ancient form of living mammals. Oviparous. Mammæ not provided with distinct teats. Functional teeth not present in adult.

Order *MONOTREMATA* (Egg laying mammals).

Muzzle in shape of beak either flat or cylindrical. Mammæ rudimentary. Family *ECHIDNÆ* (Anteaters).

Muzzle in the form of a long and cylindrical beak. Hands and feet not webbed, but provided with strong digging claws. Tongue extensile.

Genus *TACHYGLOSSUS* (Echidna).

Form stout and depressed. Teeth never present. Fur intermixed with stout sharp spines. Tail short. Vertebral formulæ—C. 7, D. 16, L. 3, S. 3, Cdl. 12-41.

*Tachyglossus aculeata* var *setosa* (Hairy Echidna, "Poreupine Anteater").

Genus *ORNITHORHYNCHUS*.

Form elongated and depressed. Fine teeth present in young. Fur soft and velvety. Tail broad and flat. Vertebral formulæ—C. 7, D. 17, L. 2, S. 2, Cdl. 20 or 21—48 or 49.

*Ornithorhynchus anatinus* (Platypus).

*MONOTREMATA* (Monotremes).

The Monotremes represent a type of primitive mammal. They exist to-day only in the Australian Zone, and form what may be termed the egg-laying mammals. There are two main species, the Echidna or Spiny Anteater and the Platypus, the first being a terrestrial animal, and the second an aquatic form. Apart from the fact that they lay eggs, the *Monotremata* (*Prototheria*) show other taxonomic characteristics which resemble, in many respects, certain features of the birds and reptiles of to-day. In this they are only affording proofs of their primitive type, and the manner in which their evolutionary progress has remained stationary, for reasons yet to be investigated. Apart from the fact that they are oviparous, the *Monotremata* present other peculiarities. Those relating to their osteology are particularly interesting, and will be dealt with in detail later. But mention might be made here concerning the fact that in the egg-laying Mammals the mammals are not provided with distinct teats, but the milk is supplied from the mammary glands through a number of small pores, the milk being pressed out by special muscles provided to meet the special needs of the case. This is but a single external opening for the fœtal and reproductive elements. The muzzle is drawn out either in the form of a flattened or cylindrical beak. The limbs are subequal in length, and all the five toes are provided with claws. The male has a spur on the inner side of the heel, which spur is connected with a crural gland by means of a long poison duct. The external ear is without conch. Functional teeth are absent, but teeth are present for a short time in the young platypus. These are shed and replaced by horny crushing plates. The fact that such teeth occur shows that the ancestors of the Monotremes must have had functional teeth at no very distant era of evolutionary epoch, and that the phases of reduction have not yet pushed them backwards to the egg stage.

## OSTEOLOGY.

The skeletons of the *Monotremata* make distinct approaches to that order of reptiles called the *Anomodontia*, and it is convenient to regard this creature as being links between those beast-like reptiles and the true Mammals. As a secondary issue there are some links with birds, but the chief connection is with the *Theromorphus reptilia*. Birds have indirectly arisen from a reptilian ancestor, it naturally follows that the lowest Mammals should manifest skeletal elements in common with them, but in the present case we prefer to insist more strongly upon the truly reptilian relationships of the *Monotremata*. In the skull the quadrate bone is fixed, and not free for ginglymoidal motion, as in birds, the inter parietal is well developed, but early coalesces with the surrounding elements to form a solid bird-like cranium. In the anteater the whole skull is so avian in appearance as to frequently cause it to be mistaken for the head of a bird. In the sterno-scapular arch there is a supernumary bone directly derived from that reptile. It is T shaped, and overlies the breast bone. It functions as an inter-clavicle, and accordingly retains that name. The chondroid centres that foreran the ossified stage of this bone are known to medical science as "Brecht's Cartilages." Here we must imagine that the fully ossified bone of the *Theromorpha* and the *Monotremata* has been reduced to the lowest Cartilaginous stage, and even as such only re-appears as a direct act of atavism.

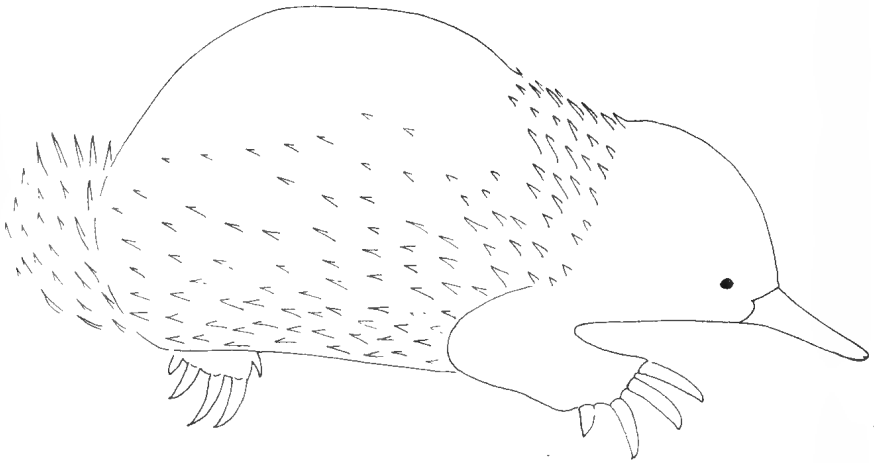
As in birds, the shoulder blades are connected with the breast bone by a distinct bone—the coracoid—reduced in man to a mere process of the scapula. A third element is the epi-coracoid, but as this bone is the homologue of the pre-coracoid of the *Anomodontia*, it is sometimes called by that name. The whole build of the scapular arch is extremely powerful, and in many ways recalls that of the European Mole (*Talpa*), similarity of function having called out simulating structure. The osteology of the monotremes is quite worthy of the special attention of the student, the foregoing being salient facts only.

## PHYSIOLOGICAL VESTIGE.

The homologue of the egg duct of the platypus is normally represented in the male of the human race, atrophied to a mere sinus—the "Sinus Pocularis."



## SPINY ANTEATER.

*Tachyglossus aculeata var setosa.*

Type specimen not in existence.

This variety is confined to Tasmania. The species extends to the mainland and allied genera to New Guinea.

General character stout and depressed, the muzzle being in the form of a long cylindrical beak. The body covered with fur, the upper part having spines interspaced in the fur. General colour of the head pale brown, of the back dark brown, and of the underside pale brown. Tail rudimentary. Toes 5-5, all clawed. Head and body (average measurements) 400 mm. The sexes not differing greatly in size. Terrestrial and fossorial.

References—For early synonymy see Thomas, Catalogue of C. & M., British Museum, p. 381 (1888), and for recent articles, as those written by Mr. H. Burrell in "The Australian Zoologist," Vol. I., pt. VIII.

The Spiny Anteater is fairly common in several parts of Tasmania, notably the Lakes districts and the East Coast. The spines of the Tasmanian variety are not so long as the mainland form, but the hair is denser, as with most insular forms. The spines form the only means of defence of this harmless animal, for, when it anticipates danger, it rolls itself into a ball and presents an array of spines to the attacker. The act of rolling is done by means of a wonderful series of surface skin muscles. But in spite of this formidable armour, the Spiny Anteater has a vulnerable point, like Achilles of old, for if it is touched on one side it contracts its body in this direction, and exposes the hind foot of the other side.

If this be quickly seized the animal can be lifted up and carried. Examining such an animal, the absence of external conches will be noticed, and especially the long beak-like muzzle and short stumpy tail. The marsupial pouch is not fully developed except during the breeding season. Another point of interest is the great development of the claws, which are used for burrowing, and the animal can use these to such good advantage that it can soon burrow itself underground when threatened with danger or is in search of food.

Spiny Anteaters are immensely strong for their size, and if it is attempted to keep them in captivity nothing except concrete floors and iron bars will avail. They are expert climbers, and will explore every inch of any cage in which they are confined, and will, moreover, move objects which at first sight appear impossible for them to disturb.

The spur on the heel was at one time considered to be venomous, and from this the name *Echidna* (Adder) was given. There is no poison, however, and the name is therefore not very appropriate. As regards scientific writings, the designation *Echidna* has been replaced by *Tachyglossus*.

As its vernacular designation suggests, the chief food of this species consists of ants and their eggs. Using its powerful digging claws, the animal soon uproots an ants nest once one is discovered. It then protrudes its tongue, which is covered with a sticky saliva, amid the ants, and in this manner laps up the ants in a very short period. The jaws are destitute of teeth, not even being provided with the "milk teeth," or later having such plates at the Platypus. In their place, however, there are other functional elements for dealing with the animal's peculiar form of diet, as the palate contains a number of small spines.

One of the earliest records we have of the capture of a Spiny Anteater in Tasmania is that contained in the log of the "Providence." During Captain Bligh's second voyage in connection with the transport of the Bread Fruit tree from the South Seas to the West Indies, he anchored in Adventure Bay. Under the date of February 7th, 1792, appears the following interesting record:—

"Lieutenant Guthrie, in an excursion to-day, killed an animal of a very odd form. It was 17 inches long, and the same size round the shoulders, to which a small flat head is connected so close that it can scarcely be said to have a neck. It has no mouth like any other animal, but a kind of a duck bill 2 inches long, which opens at the extremity, where it will not admit above the size of a small pistol ball. The tongue is very small. It has four legs, which carry the belly, about an inch or two from the ground, and on each foot it has three strong claws an inch long, and two about a quarter of an inch. On the hind feet it has the same number, but they resemble more the thumb and fingers of a hand, except that the fore claw is the longest, and curved. The eyes are remarkably small, and lie just above the beak. It has no tail, but a rump not unlike that of a penguin, on which are some quills about an inch long, as strong and as like those of a porcupine. These quills, or prickles, are all over its back amidst a thick coat of rusty brown hair; but the belly is of a light greyish colour. The skin is remarkably white." (MS. the Mitchell Library.)

The flea found on the Spiny Anteater is a distinct species—*Bradiopsylla echidnae*.

## PLATYPUS.

*Ornithorhynchus anatinus.*

Type specimen in the British Museum.

Tasmania and the East Coast of Australia, as far North as Queensland.

General character elongate and depressed, the muzzle in the shape of a broad, flat, horny beak. The body covered with short soft underfur, and longer projecting fur interspaced. General colour dark brown above and greyish white below. Tail well developed, broad and flat.

Toes 5-5, broadly webbed, the membrane extending far beyond the tips of the claws. All toes have long claws.

Head and body (average measurement)—Male 420 mm.; female, 330 mm. The males are considerably larger than the females. Aquatic and fossorial.

Head and body	..	520 mm.	480 mm.
Tail	.. ..	170 mm.	140 mm.
Hind foot	.. ..	65 mm.	60 mm.

References. For synonymy see Thomas, Cat. M. & M. Brit. Museum, p. 388 (1888), and for details of life history, the excellent papers of Mr. H. Burrell, in the Australian Zoologist, Vol. I., pl. VIII., and Vol. II., pt. 11.

The Platypus is now to be met with only in the distant lakes and streams, but in many of these it is still plentiful. In the lakes in the National Park, where all native life is protected, numbers of this species may be seen in the calm of the evening. This species is recognised easily owing to the expansion of the muzzle into a broad duck-like beak. In fact, the appearance of the animal is so peculiar that broad duck-like beak. In fact, the appearance of the animal is so peculiar that when the skin of the first specimen was sent home to England it was regarded for some time as the work of a skilful articulator, who had a mind to play a joke on the naturalists of his day. With the advent of further evidence the seeming paradox had to be admitted, but it was very many years before the life cycle of the species was known, and the existence of such a peculiarity as an egg-laying mammal fully established.

The Platypus is almost purely an aquatic animal, and is seen at its best disporting in some mountain lake or creek. Unfortunately, nearly all the published illustrations of the platypus show the animal, or rather attempt to show it, in the act of progressing on land. In doing so the illustrators show the membrane of the foot fully extended. This is entirely wrong. On such occasions as the platypus visits the land the membrane of the foot is folded back, so as to give the long claws full play. With the aid of these the animal shuffles along in a very peculiar manner.

The platypus usually makes its burrow in the banks of a creek or lake, starting below the water level, and burrowing on a gradual upward slope for fifteen or even fifty feet, but the ordinary living burrows are not as long as the nesting burrow. Occasionally a second tunnel is made, so as to come out above the water level. And in the course of the tunnel there are often small side passages. At the end of the burrow a hollow is made, and this is lined with grass and leaves. The tunnel is blocked up in several places when occupied by the female. It is in this nest that the eggs of the platypus are laid. These are covered with a tough leathery coating, more after the fashion of reptiles than the brittle covering of the eggs of birds. From one to three eggs may be laid at one time, and in the event of there being more than one the eggs are attached to each other. Mr. Harry Burrell, who has devoted much time to the study of the life history of the Platypus, has published a series of measurements of the eggs and young. From these it is seen that the average size of the egg is approximately 17 millimetres long by 13 millimetres in breadth. As regards the young, Mr. Burrell writes:—"I think it is safe to state that the young *Ornithorhynchus* is 20 mm. in length at hatching."

There is one point with regard to the Platypus to which we particularly wish to refer, and that is the general belief held by many people that the Platypus eats fish. It is as firmly rooted as the mistaken idea that snakes swallow their young, or that kangaroo are born in the pouch. The Platypus feeds upon water insects, molluscs, and crustacea, which it obtains by diving to the bottom and burrowing about with its bill. Occasionally they will quietly feed along the shallow edges of a pool. The food so gathered is stored in the peculiar cheek pouches, and the animal rises to the surface, and proceeds to treat the food by grinding it with the rudimentary horny plates which serve as teeth. As soon as this is done the animal again dives in search of further nourishment. Anyone who carefully examines a Platypus well will see how impossible it is for such an animal to eat fish. The only manner in which the platypus could interfere with the fish would be by eating the ova during the course of its burrowing amid the gravel beds of the lakes and streams. As regards this aspect of the case, we can only say that we have not yet examined a platypus which gave indications of having fed upon fish ova. One very wet winter a platypus appeared in the gutters of a street in Launceston, and was brought alive to the Museum. We used to swim this creature in a bath of water, and he would come out and preen his fur with his claws in a most graceful manner. Unfortunately, it was accidentally crushed to death one night, between a down pipe and the wall, while evidently seeking to investigate the sound of running water incidental to a tap that had been carelessly turned, without completely shutting the water off.

## SUB-CLASS II. *MARSUPIALIA* (Marsupials).

Viviparous. Young born in immature state, and transferred to mammae by mother. Mammae enclosed in permanent pouch. Marsupial bones present.

### Order *MARSUPIALIA* (Pouched Mammals).

Limbs sub-equal, hinder larger. Teeth variable.

#### Sub-order I. *DIPROTODONTIA*.

Two long and powerful incisors in lower jaw.

Family *MACROPODIDÆ* (Kangaroos, Wallabies, etc.).

Hind legs longer and stronger than fore limbs. Fore feet 5 digits free. Fourth toe of hind foot very large. Pouch opens forwards.

#### Genus *MACROPUS* (Kangaroos and Wallabies).

Size variable. Limbs very unequal. End of nose naked. Ears large. Central hind claw long and projecting. Dentition—*I.* 1/1, *C.* 0/0 or 1/0, *P.* 2/2, *M.* 4/4.

*Macropus giganteus* var *tasmaniensis*.—Forester Kangaroo.

*Macropus ruficollis* var *bennetti*.—Bennett's Wallaby. "Kangaroo."

*Macropus billardieri*.—Rufous Wallaby.

#### Genus *BETTONGIA* (Bettongs).

Size small. End of nose naked. Ears very short and rounded. Fore claws long and strong. Tail prehensile and hairy, with slight crest. Hind feet longer than head. Dentition—*I.* 3/1, *C.* 1/0, *P.* 2/2, *M.* 4/4.

*Bettongia cuniculus*.—Tas. Bettong (Rat Kangaroo).

Genus *POTOROUS* (Rat Kangaroos).

Size small. Tip of nose naked. Ears very short and rounded. Fore claws long and slender. Tail hairy, prehensile, and without crest. Hind feet shorter than head. Dentition—I. 3/1, C. 1/0, P. 2/2, M. 4/4.

*Potorous tridactylus (apicalis)*.—Kat. Kangaroo.

## Family PHALANGERIDÆ (Phalangers), Aust. "Opossums."

Arboreal. Hallux opposable to other toes. Muzzle short and broad. Tail long and usually prehensile. Five fingers and toes bound together by a common integument.

Genus *DROMICEA* (Dormouse Phalangers) "Opossum Mice."

Size very small. Ears large and almost naked. Tail furry at base, rest scaled. Fingers and toes without broad terminal pads. Fore claws short. Hind claws well developed. Fur thick and very soft. No flying membranes. Dentition—I. 3/3, C. 1/0, P. 1/1 or 2/2, M. 2/1 or 3/2.

*Dromicea lepida*. Lesser Dormouse Phalanger.

*Dromicea nana*.—Dormouse Phalanger.

Genus *PETAURUS* (Flying Phalanger).

Size moderate. Ears medium. Tail long and furry. Claws long and curved. Fur soft. Flying membrane between flanks. Dentition—I. 3/2, C. 1/0, P. 1/1 or 2/2, M. 4/4.

*Petaurus breviceps*. Lesser Flying Phalanger.

Genus *PSEUDOCHIRUS* (Ring-tailed Phalangers).

Size fairly large. Ears medium. Tail long, prehensile and naked at top. Fur short. No flying membrane. Dentition—I. 0/3 or 3/3, C. 0/1 or 1/1, P. 3/3, M. 4/4.

*Pseudochirus cooki*.—Ring-tailed Phalanger.

Genus *TRICHOSURUS* (Phalangers).

Size large. Ears medium or short. Tail bushy, naked underneath for hinder half. Fur thick. No flying membrane. Dentition—I. 3/2, C. 1/0, P. 2/2 or 2/3, M. 4/4.

*Trichosurus vulpecula* var. *fuliginosus*.—Tas. Phalanger ("Brush Opossum").

## Family PHASCOLOMYIDÆ (Wombats).

Form stout and clumsy. Body massive. Muzzle short and broad. Tail rudimentary. Fore feet with powerful digging claws.

Genus *PHASCOLOMYS* (Wombats).

Limbs strong. Fur very coarse. Ears short and rounded. Dentition—I. 1/1, C. 0/0, P. 1/1, M. 4/4.

*Phascalomys ursinus*. Flinder's Island Wombat.

*Phascalomys tasmaniensis*.—Tas. Wombat.

Sub-order II. *POLYPROTODONTIA*.

Incisors numerous. 4-5 in upper, and 3-4 in lower jaw, on each side.  
Family PERAMELIDÆ (Bandicoots).

Pouch opens backwards. Mammaræ 6 or 8. Fore feet, 1st and 5th digits stout and clawless. Tail tapering.

(Genus *PERAMELES* (Bandicoots).

Muzzle long and pointed. Tail tapering, scaly and naked. Dentition—I. 4/3 or 5/3, C. 1/1, P. 3/3, M. 4/4.

*Perameles obcsula*.—Short-nosed Bandicoot.

*Perameles gunni*.—Tas. Striped Bandicoot).

Family DASYURIDÆ (Thylacines, Dasyures, etc.).

Limbs sub-equal. Forefeet with 5 digits. Hind feet with 4 or 5 toes. Hallux small and clawless or absent.

(Genus *THYLACINUS* (Marsupial Wolves).

Form elongated and wolf-like. Muzzle long and slender. Tail long, well developed, and gradually merging into body. Toes sub-equal, with short thick claws. Hallux absent. Pouch opens backwards. Marsupial bones not ossified, remaining cartilagenious styles throughout life. Dentition—I. 4/3, C. 1/1, P. 3/3, M. 4/4.

*Thylacinus cynocephalus*.—Tas. Marsupial Wolf ("Tiger").

(Genus *SARCOPHILUS* (Tas. Devils).

Form stout and powerful. Muzzle short and broad. Tail moderate. Toes sub-equal, with stout claws. Hallux absent. Dentition—I. 4/3, C. 1/1, P. 2/2, M. 4/4.

*Sarcophilus harrisi*.—Tas. Devil.

(Genus *DASYURUS* (Dasyures -Native Cats).

Ears long and narrow. Toes sub-equal, with long and sharp claws. Tail long and hairy. Pouch opening vertically downwards. Dentition—I. 4/3, C. 1/1, P. 2/2, M. 4/4.

*Dasyurus maculatus*.—Tiger Cat.

*Dasyurus viverrinus*.—Native Cat.

(Genus *PHASCOLOGALE* (Marsupial Mice).

Ears moderate. Tail long. Hallux present. Pouch practically obsolete. Dentition—I. 4/3, C. 1/1, P. 3/2, M. 4/4.

*Phascologale swainsoni*.—Swainson's Pouched Mouse.

*Phascologale minima*.—Little Pouched Mouse.

(Genus *SMINTHOPSIS* (Marsupial Mice).

Ears large and broad. Tail moderate. Hallux present. Pouch well developed. Dentition—I. 4/3, C. 1/1, P. 3/3, M. 4/4.

*Sminthopsis leucopus*. White-footed Pouched Mouse.

## MARSUPIALIA (Marsupials).

The Marsupials or Pouched Mammals represent a type of animal which, except for the true opossums and a species of bush rat of Central America, is only found in a living state to-day in Australia and the adjacent islands. Marsupials may be either terrestrial or arboreal. They are viviparous, but the young are born in a very imperfect state, and transferred to the pouch partly by the mother and partly by their own exertions. The young are nourished by milk injected by the special muscles controlling the mammae, to which latter members the young become firmly attached soon after birth. This is caused by the end of the mammae swelling inside the mouth of the young. This is the foundation of the bushman's belief that the young are "born in the pouch." This functional pouch or *marsupium* forms the chief distinguishing feature of the sub-class, for no other viviparous mammals have such a member.

The Marsupials fall naturally into two sub-orders, the *Diprotodontia*, in which there are only two long and powerful incisions in lower jaw, which leaves a gap between them and the molars; and the *Polyprotodontia*, in which there is an even row of incisors, four to five in the upper and three to four in the lower jaw, on each side. The first group are vegetarians, but the Polyprotodonts embrace animals that subsist on a mixed diet, as well as some carnivorous species.

The Kangaroos, Wallabies, Bettongs, Rat Kangaroo, Phalangers ("Opossums"), Opossum Mice, Flying Phalangers, and the Wombats belong to the Diprotodonts. To the Polyprotodonts belong the Bandicoots, Native Cats, Tasmanian Devil, Thylacine, Marsupial Mice, etc. It is also of interest to note that the American Opossums (the true Opossums) belong to the *Polyprotodontia*, and not to the *Diprotodontia*, as do our Tasmanian and Australian Phalangers.

The Kangaroos and Wallabies are represented by three species in Tasmania.

As the points of difference between the vernacular designations of Kangaroo and Wallaby are not very well understood, the following table of characteristics is given:—

### KANGAROOS.

Hind foot more than 260 millimetres long. Basal length of skull when adult more than 135 millimetres. Combined length of molars 1-3 30 millimetres or more.  
Example—Forester Kangaroo.

### LARGE WALLABIES.

Hind foot from 160 to 250 millimetres long. Skull when adult between 108 and 130 millimetres. Combined lengths of Ms. 1-3 from 21 to 28 millimetres.  
Example—Bennett's Wallaby.

### SMALL WALLABIES.

Hind foot less than 150 millimetres long. Skull less than 108 millimetres. Ms. 1-3 less than 21 millimetres.

Example—Rufous Wallaby.

As with the Kangaroos and Wallabies, there is often confusion between the Bettongs and the Rat Kangaroos. Both these belong to the same Sub-family (*Potoroinæ*), and possess the following characteristics in common. The size is small, the head and body measuring not more than 600 millimetres. The claws of the fore feet are very large and unequal, the medium ones being much the longest. The ears are small and rounded. As regards the characters which render them generically different, the following points are the main ones to be considered.

## BETTONGS.

Fore claws long and strong. Hind foot as long or longer than head. Tail prehensile, and with a more or less prominent crest.

Example—Tasmanian Bettong.

## RAT KANGAROOS.

Fore claws long and slender. Hind foot shorter than head. Tail lacking a crest.

Example—Tasmanian Rat Kangaroo.

The various Phalangers, the lesser Dormouse Opossums, Dormouse Opossums, Lesser Flying Phalanger, Ring-tailed Phalanger, and Tasmanian (Brush) Phalanger are easily separated, the only point that may be drawn attention to is that the "Black" and "Grey" Brush "Opossums" is one and the same species. The Wombats are very different in many respects to the remainder of the Sub-class, but they undoubtedly play a large part in the Marsupial group. In past eras the Wombat characteristics probably played a far greater part than they do to-day.

Coming to the *Polyprotodontia*, the two species of Bandicoots may be recognised easily owing to the white stripes that are present (particularly so in the young) on Gunn's Bandicoot. The two most interesting animals are without doubt the Thylacine or "Native Tiger" and the Tasmanian Devil. The so-called Native Cats can be recognised by the fact that the larger species—the Tiger Cat—is always a dark brown colour with white spots, even the tail being spotted. The smaller species may be coloured either light yellowish brown or black. In both colourations white spots appear, but only on the body and not on the tail.

The Marsupial Mice are a group often misunderstood, and confused with the Opossum Mice. In Tasmania we have three species, representing two genera. Swainson's Pouched Mouse and the Little Pouched Mouse belong to the genus *Phascologale*, which is notable chiefly for the fact that the pouch is practically obsolete. The remaining species, the White-footed Pouched Mouse, has a well developed pouch, and belong to the genus *Sminthropsis*.

## DIPROTODONTS.

The Marsupials are divided into two sub-classes, the *Diprotodontia* and the *Polyprotodontia*. The outstanding characteristic of the former class is the occurrence of two long incisors in the lower jaw. The members of this sub-class which occur in the Tasmanian faunal list are as follows:—

*M. giganteus* var *tasmaniensis*.—Forester Kangaroo.

*M. ruficollis* var *bennetti*.—Bennett's wallaby.

*M. billardieri*.—Rufous Wallaby.

*B. cuniculus*.—Tasmanian Bettong.

*P. tridactylus*.—Rat Kangaroo.

*D. lepida*.—Lesser Dormouse Phalanger.

*D. nana*.—Dormouse Phalanger.

*P. breviceps*.—Lesser Flying Phalanger.

*P. cooki*.—Ring-tailed Phalanger.

*T. vulpecula* var *fuliginosus*.—Tasmanian Phalanger.

*P. ursinus*.—Bass Straits Wombat.

*P. tasmaniensis*.—Tasmanian Wombat.



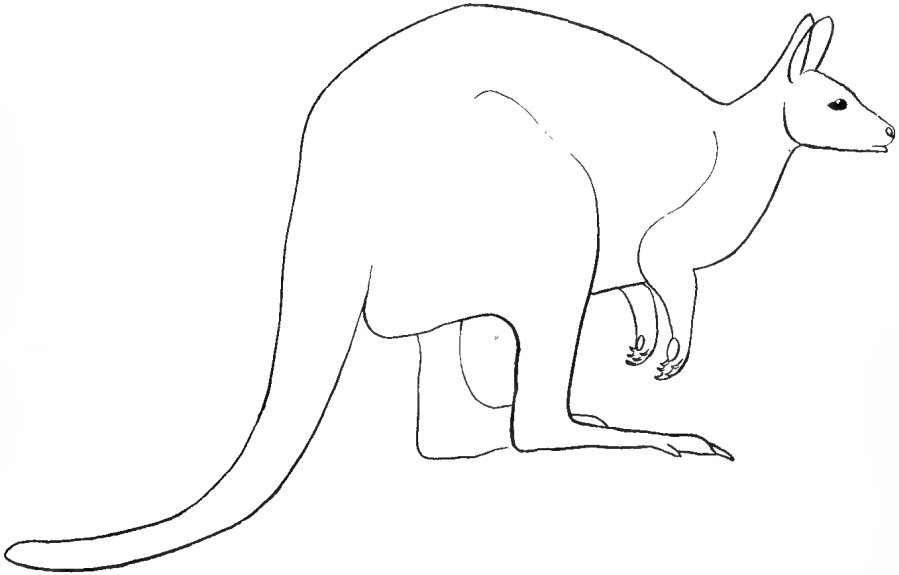
## KANGAROOS, WALLABIES, ETC.

The family *Macropodidae* (Kangaroos, Wallabies, etc.) is represented in Tasmania, as far as living forms go, by five species only. In point of numbers, however, these typical representatives of the Australian Zoogeographical Zone occupy a prominent position in the faunal list of the island State. Excessive hunting has, however, done much to reduce their numbers, and in some districts the Kangaroo tribe has been practically exterminated. With the rising tide of public interest as regards the economic value of the country's fauna and the passing of comprehensive legislation towards the better protection of our native animals, it is to be hoped that the conditions in the future will show very considerable improvement when compared with the history of the past.

The Kangaroo family are so well known that it would be superfluous in the present instance to enter into a detailed description of their general habits. Reference to the systematic list and the general notes to each species should enable the student to identify any species concerning which there is any doubt.

## FORESTER KANGAROO.

*Macropus giganteus var tasmaniensis*, Le Souef.



The Tasmanian form of the great Kangaroo was formerly known as *M. g. fuliginosus*, but Mr. A. S. Le Souef has recently shown ("Australian Zoologist," Vol. 3, p. 139) that this name should be reserved for the Kangaroo Island variety.

This variety is confined to Tasmania, but the species extends to the mainland.

Size very large, form slender and graceful. Head long and conical, the muzzle being hairy, the hair coming down the nostrils nearly to the lips. (This serves to immediately distinguish it from Bennett's Wallaby, apart from other considerations.) The body covered with thick fur grey smoky brown on the back, and whitish grey to light brown on the under parts. Tail grey, with terminal portion black. Central hind claw long and projecting. The body colour of different individuals we have examined shows considerable variation.

Measurements of two specimens in the Tasmanian Museum:—

Head and body	..	1400 mm.	1230 mm.
Tail	.. ..	1000 mm.	970 mm.
Hind foot	.. ..	380 mm.	360 mm.

Reference—Thomas, Cat. M. & M. Brit. Museum, p. 19 (1888).

The Forester Kangaroo, which formerly roamed over practically the whole of Tasmania, has been hunted almost to extermination. These animals are now wholly protected, and there is some chance of the survivors of this once plentiful species increasing in numbers if properly safeguarded. For many particulars relating to their habits we have of necessity to rely on the observations of those who saw them in the early days of the colony before their numbers had been reduced to the present limits. Fortunately, such keen and observant naturalists as John Gould and Ronald Gunn left records relating to this species. The Forester, as with other of the Marsupials at the present time, does not have one fixed colour for its fur. The general body colour may vary from sooty or rusty brown to foxy red. Albinos may also be met with. As a general rule the colour is rusty brown, with under parts greyish, the toes and end of tail being black.

In regard to size, the male is approximately one-eighth as large again as the female, and considerably more powerful. Gould, quoting Elliot, gives the details of a hunt after an old man "Boomer" or Forester Kangaroo. He was hunted for eighteen miles, and only caught when he took to the sea, and had swam another two miles. Along the beach the tracks in the sand showed that he covered fifteen feet at each hop, the spacing being remarkably regular.

Ronald Gunn records while this species may be met with in flocks at places where food is plentiful, yet as a general rule they are not gregarious. They feed mostly at early dawn or in the evening, and spend most of the day in the high ferns or young wattle scrub. Their sense of smell and their hearing is excellent, and they rely on these senses to a large degree in order to avoid their enemies. From personal observations we can fully confirm the above remarks.

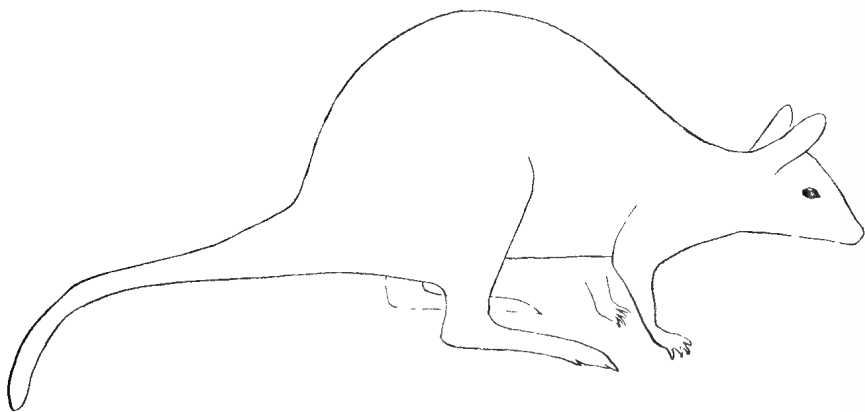
## OSTEOLOGY.

The skeleton of a Kangaroo shows the adaptation to a vertical balance, tail, pelvis, and hind limbs being enlarged at the expense of the fore-quarters. Owing to the urgent need for the manipulation of the pouch, the arm responds to the full arc of movement extending from pronation to supination, and the humerus, by virtue of this, retains most of the osteological character common to the order. This is, at first sight, so curious that the slight difference between a wombat's arm and a Kangaroo's arm seems astounding, but taken in connection with the needs of the marsupial habit, the puzzle is explained. In all this we must remember there has been the retention of a primitive humeral type held rigidly to the common needs of the order, both of which factors are more potent than the mutations imposed by the desiderata of sub-orders and genera upon animals relegated to somewhat divergent methods of life. The skull of a Forester measures about eight inches in length, that of the extinct kangaroo, *Macropus titan*, exceeding this by a full inch, while that of *Palorchestes*, the greatest giant of all the true Kangaroos, living or extinct, was seventeen inches long, which is about the size of a modern cow's skull. Remains of this latter pleistocene giant have been recovered from the swamp lands near Smithton, Tasmania, but up to date only of a fragmentary character.

Like elephants, Kangaroos have a forward movement of the several moities of the tooth line, the actual decidual replacement, however, being restricted to premolar No. 4. Premolar No. 3 is early shed, and not replaced, but when it and the milk premolar No. 4 are in position the tooth line simulates the adult condition in general appearance, and actual measurement, and in these circumstances it is often necessary to open the outer bony tables of the jaw to determine dental succession in fossil specimens. It may be wise to note here that Mr. Oldfield Thomas, in his work upon the Marsupial order, uses the term "adult" for any animal in which the replacement of premolar No. 4 has taken place, even if molar No. 4 has not cut the alveolar state. The condition incidental to molar No. 4 being fully functional, is termed by this author "aged." In strict osteology, of course, this nomenclature is incorrect, but it is usually subscribed to, upon the grounds of convenience, and students must use the term with a thought to their real meaning, otherwise various anomalies (in cranial sutural extinction) are sure to present themselves.

### RED-NECKED OR BENNETT'S WALLABY.

*Macropus ruficollis* var *bennetti*. Waterhouse.



*Macropus bennetti*. Waterhouse, P.Z.S. (1857), p. 103.

Type specimen of variety unknown. (The type of the species is in the Paris Museum.)

This variety is confined to Tasmania, but the species extends to Victoria and N.S.W.

The largest of the Wallabies. Form slender and graceful. Head long and conical. Nose naked, the hair not growing between the nostrils. General colour dark fawn back of neck and rump rufous or brownish grey, back of ears almost black, chest and underparts greyish white tail smoky grey.

Owing to excessive hunting not many large specimens of this species are now reared. The following measurements of two specimens are below the correct adult size.

Head and body	..	900 mm.	830 mm.
Tail	..	600 mm.	403 mm.
Hind foot	..	220 mm.	230 mm.

References—Thomas, Cat. M. & M., Brit. Museum, p. 34 (1888). Gould, Mammals of Australia, Vol. II., pg. 16 and 17 (1856).

Bennett's Wallaby is the Tasmanian variety of the typical mainland Red-necked Wallaby. It is the largest of the Wallabies, and owing to the fact that the Kangaroo has been hunted almost to extinction in Tasmania, this species is usually referred to as a Kangaroo by country dwellers. As with the Kangaroo and other animals—the Wombats, for instance—the colour of the fur varies considerably in different specimens. Our observations tend to show that this depends to a large extent upon environment. Particularly so as regards the animals of the mountain ranges as compared with those that habitually frequent the country of lower altitudes. This species may be met with at all altitudes in Tasmania, from the coastal plains to the summits of the mountains. We have observed it at the summit of Mount Field West, only a few feet below the Cairn (4721 feet). In the winter months they are often driven out by the snow, but even when the snow is thick we have observed them at high altitudes. In the mountains they particularly favour a sunny hillside, where they can rest during the greater part of the day.

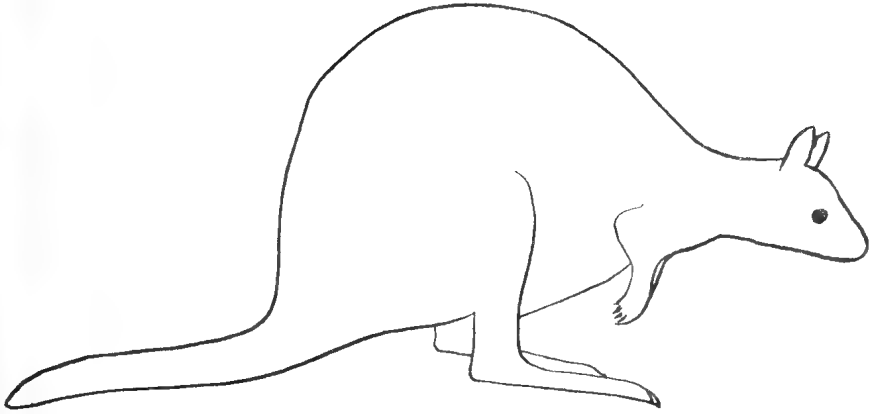
## OSTEOLOGY.

A large skull of one of these animals placed between two vertical rods will measure nearly six inches (152 mm.), as against eight inches for the Forester. This measurement must not, however, be confounded with that usually termed "basal length," since this latter would reduce the total by half an inch. The following skull characters may be noted in passing:—As is usual among marsupials, the nasal bones expand as they go backwards, and the angles of the lower jaws are formed inward. The interparietal bone appears upon the superior surface of the skull in early life, but may ankylose to extinction later on. The frontals are depressed, and the parietals constructed in the central region of the skull, or, in other words, as they individually surmount and bound the orbits. The malar throws down a pre-masseter process, a dwarfed homologue of the infinitely more powerful structure of the extinct *Nototheria* and *Euryzygoma*; and the lachrymal tends to form a small supraorbital process; the ballæ are fashioned from the alisphenoids. Palatine foramina are present, and the posterior palatine floor shows some fenestration. The dental formula of the adult animal is as follows:—

I. 1.2.3	P. 0.0.0.4	M. 1.2.3.4
<hr/> 1.0.0	<hr/> 0.0.0.4	<hr/> 1.2.3.4

The replacement of P. molar No. 3 not taking place, and the late eruption of molar No. 4 must be retained in the memory when dealing with immature specimens, as also the fact that any skulls showing canine teeth would manifest them in a functionless manner.

## RUFIOUS WALLABY.

*Macropus billardieri*, Desm.*Kangerus billardieri*, Desm., Mamm. (Sup.), II. (1822), p. 542.

True specimen in the Paris Museum.

Tasmania, Islands of Bass Straits and S.E. Australia.

Size small. Form stout and heavy. Colour greyish brown to dark brown above, fringed rufous, under parts smoky grey. Ears and tail very short. The tail is only about  $2\frac{1}{2}$  times the length of the head, and is coloured brown above and greyish white beneath.

Measurements of three mounted specimens in the Tasmanian Museum:

(Albino)

Head and body .. ..	430	765	640
Tail .. ..	200	320	315
Hind foot .. ..	120	140	140

References—Thomas, Cat. M. & M., Brit. Museum, p. 58 (1888). Gould, Mammals of Australia, Vol. II., pl. 35 (1860).

The Rufous-bellied Wallaby is an inhabitant of the scrub, and spends most of its time in the thick bush, whereas the larger species (Bennett's) may be met with in fairly open country. As with many other species of the Tasmanian fauna, its characteristics and colours show variations due to the localities and class of country which it inhabits. In fact, in the country you often hear Scrub, Rock, Swamp, and other wallabies spoken of as though they were several species. As a matter of fact we have no true Rock Wallabies (*Petrogale*) in Tasmania; If pressed by dogs this Wallaby will readily take to the water, and swim across a creek or lake.

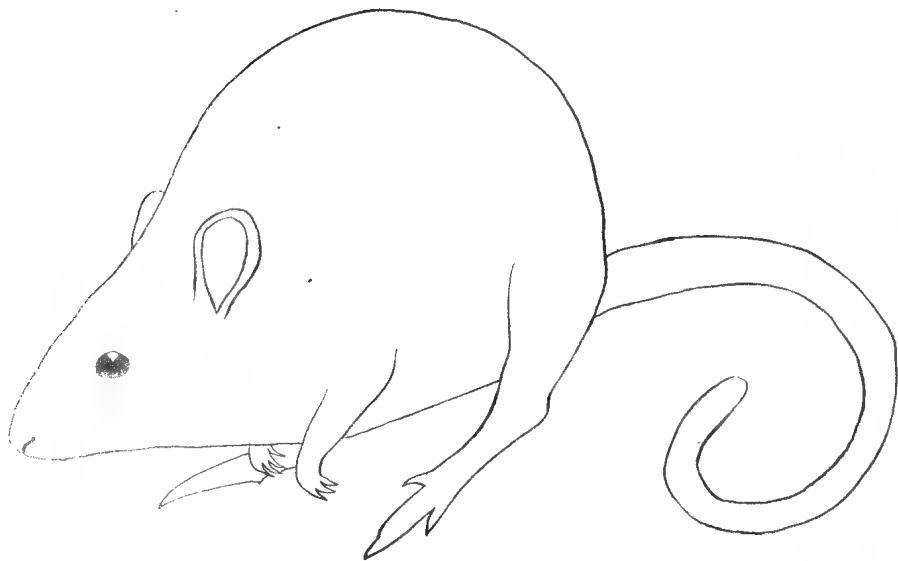
## OSTEOLOGY.

As a comparative study it is of interest to place side by side the jaws of the three animals hitherto passed in review, and if the jaw of the extinct giant *Macropus titan* is also included the value of the comparison is greatly enhanced. The following measurements give some idea of the difference in size:—*M. titan*, 208 mm.; *M. giganteus*, 180 mm.; *M. ruficollis*, 118 mm.; *M. billardieri*, 85 mm.

The last of the series, which is the "Wallaby" of Tasmanian vernacular, and the animal here under review, repeats the general characters of the Kangaroo, but shows less upbending of the premaxillary into the nasal cavity; less encroachment of molar No. 1 upon the palate; a longer premolar No. 4, a shorter nasal region, in proportion to the cranial; and larger post palatine foramina.

## TASMANIAN BETTONGI (Rat Kangaroo).

*Bettongia cuniculus*, Gray.



*Bettongia setosa*, Gray. M.N.H., I. p. (1837), p. 584.

Type specimen in British Museum.

This species is confined to Tasmania.

General form like a Wallaby, only much smaller, and not so graceful. The head rat-like. Hind feet longer than head.

General colour grey, the under parts greyish white. Arms, hands and feet white. The fur of the prehensile tail forming a more or less distinctive crest, but as a general rule the crest is not developed to any great extent. The tail has usually but not always a small white patch at the extreme tip.

	Characteristic Measurements given by B.M. Catalogue.	Specimen in Tas. Museum.	Specimen in L'ton Museum.
Head and body	.. 400 mm.	445	432
Tail .. ..	.. 300 mm.	295	305
Hind foot .. ..	.. 105-120 mm.	125	127
Ear .. ..	.. 30 mm.	40	38

References—Thomas, Cat. M. & M., Brit. Mus., p. 106 (1888). Gould, Mammals of Australia, Vol. II., pl. 63 (1854).

In Tasmania there is little distinction shown by most people between the Bettong (*Bettongia*) and the Rat Kangaroo (*Potorous*). As a matter of fact the distinctions are such as to create different genera. Whereas the hind foot of Bettongs is usually upwards of 110 mm. long, the same member in the Rat Kangaroo rarely exceeds 90 mm. A nest of one of these animals was obtained by Mr. O. L. Adams some years ago completely manufactured from the fibre-like strips of Stringy Bark, every scrap of which had been carried by the animal by means of its prehensile tail a quarter of a mile, and then carefully built into its position in a hole in the ground. As Mr. A. R. Reid has pointed out, the Bettong hops like a kangaroo, whilst *P. tridactylus* runs like a rat.

### OSTEOLOGY.

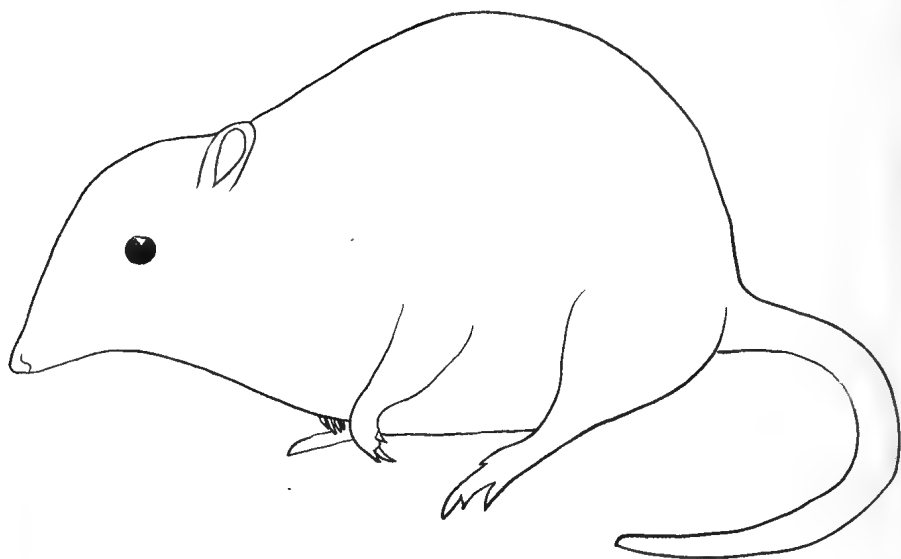
It is easy to separate the skull of this animal from that of the common Kangaroo Rat, even when the anterior portion is alone available, since the nasal bones of the latter are long and narrow, and without any material expansion behind the maxillo-maxillary suture. In *Bettongia*, the nasals, if anything, cut slightly inwards from the nasal cavity to the above-named suture, and then considerably widen out.

The dental formula is curious, as the absolute suppression of molar No. 5 has not been accomplished in the genus, and this tooth may re-appear, in individual specimens, at any time.

Accepted formula thus:—

$$\begin{array}{ccccccc}
 & 1.2.3 & & 1 & & 0.0.3.4 & & 1.2.3.4 \\
 \text{I.} & \text{—} & \text{C.} & \text{—} & \text{P} & \text{—} & \text{M.} & \text{—} \times 2 = 34 \\
 & 1.0.0 & & 0 & & 0.0.3.4 & & 1.2.3.4
 \end{array}$$

## RAT KANGAROO ("Wallaby Rat").

*Potorous tridactylus (apicalis).*

Kangaroo Rat, Philip, Voyage Bot. Bay (1789), p. 277.

Type specimen not in existence.

Tasmanian and S.E. Australian.

General form like the Bettong, only more slender and without the crested tail. Colour variable. General colour of upper parts grey to dusty brown. Under surface tinged with grey. Hands or feet may be either grey or brown. Tail dark brown, with white tip, about  $1\frac{1}{2}$  inches long. Hind feet shorter than head.

The following measurements were taken from specimens as follows:—(1) Male specimen (mounted) in Tasmanian Museum. (2) Immature specimen (mounted) in Tasmanian Museum. (Nos. 3, 4, 5 and 6) Four animals captured at Magnet Range, August-October, 1904, at an elevation of 2000ft.:—

	1	2	3	4	5	6
Head and body ..	420 mm.	260 mm.	340 mm.	345 mm.	365 mm.	305 mm.
Tail .. ..	235	165	238	230	237	205
Hind foot ..	90	75	84	80	86	70
Ear .. ..	36	22	40	40	44	41

References—Thomas, Cat. M. & M. Brit. Mus., p. 117 (1888). Gould, Mammals of Australia, Vol. II., pl. 68 (1854).



The Rat Kangaroos, commonly called "Kangaroo Rats" or "Wallaby Rats," are easily distinguished from the Bettongs, apart from other characteristics, owing to the length of the hind feet and the mode of progression. This species is found in most parts of the country where it frequents the damper portions. The nest of grass, which is placed in a depression in the ground, is usually occupied in the daytime, as these animals, like many others, feed mostly at night. The Rat Kangaroo makes use of its prehensile tail to gather grass for its nest. In this it agrees with the Bettong.

### OSTEOLOGY.

The normal dentition of this genus is the same as that of *Bettongia*, but as already noted, the skull characters vary considerably in the two genera, the best quick and ready guide to the separation of old male skulls of *Potorous*, from those of *Bettongia*, is the nasal test already detailed.

Fully matured male skulls of *Potorous* develop a strong transverse occipito-parietal crest, and the malar increases considerably in depth at its squamosal end, but always thins away in the actual orbital regions. Age and sex also greatly develop the canine teeth, and some super ossification of the parietals may become manifest, as life goes on.

The individual skull chiefly used in making these notes being nearly mature (upon the natural age standard) carries the following teeth:—

	1.2.3		1		0.0.0.4		1.2.3.4
I.	—	C.	—	P.M.	—	M.	—
	1.0.0		0		0.0.0.4		1.2.3.4

Which means that premolars Nos. 3 and 4 have been shed, No. 4 has been replaced, and molar No. 4 is nearly, but not quite, up into line. Such a set of conditions would upon the conventional standard be called, not a nearly adult animal, but an "aged" one. This illustration of the natural and conventional standard will suffice the needs of the present work.

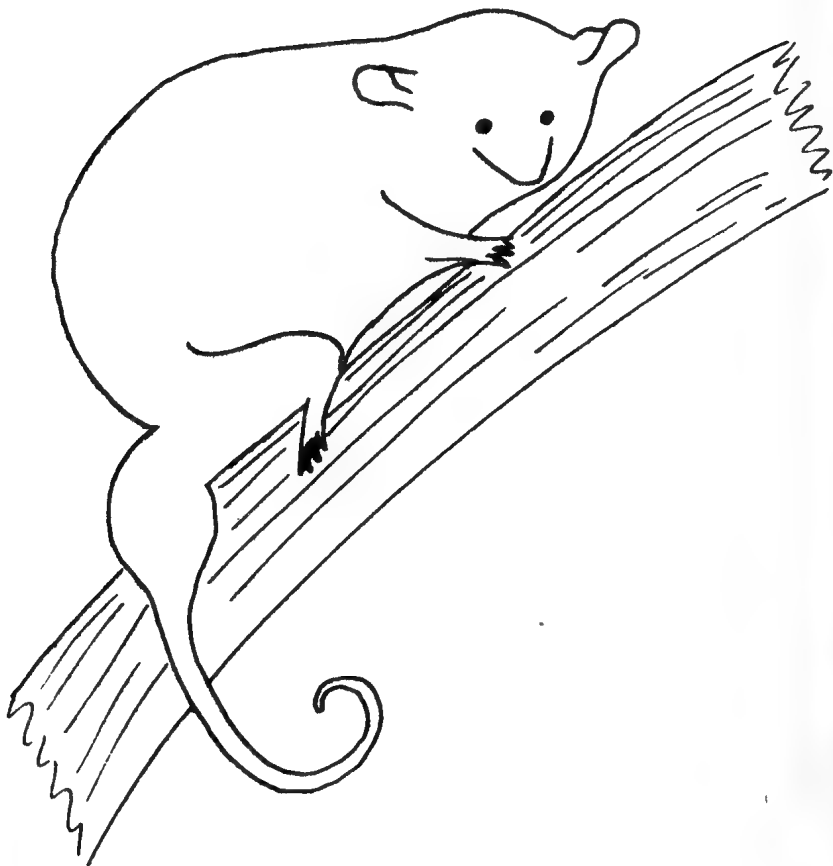
### PHALANGERS.

The family *Phalangeridae* contains the Phalangers, or the so-called Australian Opossums. As stated elsewhere, the true opossum is quite a different animal, and a native of America, but the early settlers had a habit of attaching to the peculiar animals of the Australian Realm the name of some animal of the Old World which it happened to resemble in general outline. Also, in this family, are included the small Dormouse Phalangers, commonly known as Opossum Mice.

The members of this family are largely arboreal in their habits, and the well developed prehensile tail is used to full advantage when climbing. They are all expert climbers, and it is interesting to watch a Phalanger moving along a belt of trees, and to note the quiet manner in which he moves from tree to tree without making any noise with the swaying branches.

Unless disturbed, they are seldom seen abroad in the daylight, but as soon as night falls they become active, and begin their travels in search of food. Although the larger members of this family feed largely upon leaves, etc., amid the heights of eucalypts, yet they also feed on the ground, and occasionally travel fairly long distances. It is often stated that the Phalangers descend to the ground on but rare occasions, but our personal observations lead us to believe that these animals spend far more time on the ground than they are usually credited with.

## DORMOUSE PHALANGER.

*Dromicea nana*, Desm.

*Phalangista nana*, Desm., N. Dist. H.N. (2), XXV. (1817), p. 477.

Type specimen in the Paris Museum.

This species is found in Tasmania and S.E. Australia.

General form mouse-like, the tail usually having the proximal third of the base of the tail considerably swollen by fatty secretion. General colour dull fawn, the under surfaces being slate colour, tipped with white. Different specimens show variations in general body colour.

Measurements of (1) specimen in Tasmanian Museum, (2) specimen from the Magnet Range.

	Head and body.	Tail.	Hind foot.	Ear.
1.	140	110	25	22
2.	113	112	14	22

References—Thomas, Cat. M. & M. Brit. Mus., p. 144 (1888). Gould, Mammals of Australia.

The interesting little marsupial is to be found in many parts of Tasmania, but as far as our observations go, it would appear as if *D. nana* was more common in the Northern part of the island, and *D. lepida* in the Southern portion. The habits etc., naturally make them difficult to obtain, and it is more by accident than design that specimens are secured. During the day these animals remain coiled up in the small hollow of a eucalypt or other tree, but become active at nightfall. Searching for the retreats of these animals is a tedious task, and the majority of specimens are obtained from bushmen who come across them when felling and cutting up trees in the bush. Specimens of these little animals, kept by us as pets, proved an endless source of interest and amusement. Hibernation may be either partial or complete, and if handled during the seasonal slumbers they either take no notice at all or utter a queer little protesting hiss. They appreciate a diet of bread, water, apples, cake and walnuts.

### OSTEOLOGY.

The skull is wide and flat, its width, compared with its length, being as nine is to fifteen. The usual Diprotodon conditions of the *Phalangista*, which reproduce the essentials of the extinct *Nototherian* group, widely obtain. The lower jaws show strongly incurved angular processes, and the symphysis is long, but not ankylosed to sutural extinction.

The malar throws up a post orbital process that meets with no similar response from the flat and platform-like frontal. As in the pleistocene giant, the mastoid regions are interpenetrated by air cells. The nasals are carried well out to the ends of the premaxilla, and as the usual septum is strongly in evidence the nostrils of the living animal are outlined in the skull. The bullæ are large and thin, conditions that reach a maximum in the phalangistic skull of the Native Bear (*Phascolarctus*).

The dentition is usually expressed thus: -

I.	1.2.3	C.	1	P.	1.0.3.4	M.	1.2.3.0 (or 4)
	1.2.0		0		1.0.3.4		1.2.3.0 (or 4)

The several variations are fully dealt with in works specially devoted to the *Marsupialia*.

### LESSER DORMOUSE-PHALANGER.

*Dromicæa lepida*, Thomas.

*Dromicæa lepida*, Thomas, Cat. M. & M. Brit. Museum (1888), p. 142.

Type specimen in British Museum.

This species is confined to Tasmania.

General form mouse-like. Size small, the head and body being less than 85 millimetres. General colour pale fawn. Under fur very thick and soft. Tail furry at base, gradually becoming scaly, with fine covering of very short soft hair. Base of tail naked on underside at extreme tip.

Measurements of two specimens from Tyenna (in the flesh) :—

	Head and body.	Tail.	Ear.
1.	72 mm.	77 mm.	17 mm.
2.	68 mm.	74 mm.	16 mm.

Reference—Thomas, Cat. M. & M. Brit. Mus., p. 142 (1888).

The Lesser Dormouse-Phalanger is readily distinguished from *D. nana* on account of its smaller size and more slender form. The habits of the two species appear to be very similar. We have kept both forms in captivity, and have therefore been able to make observations in this regard.

The common house mouse (*M. musculus*) often takes to a bush life, and simulates the habits of this dormouse sufficiently to be mistaken for it.

Specimens from different parts of the island show little external variations.

## OSTEOLOGY.

The skull shows about a six and a half, total ratio of width to length, the malar post orbital process is present, but practically no mastoid air cells obtain.

## LESSER FLYING PHALANGER.

*Petaurus breviceps*, Waterh.

*Petaurus (Belideus) breviceps*, Waterh., P.Z.S. (1838), p. 152.

Type in British Museum.

Tasmania (introduced in 1835) and Eastern Australia.

General form very graceful. General colour mouse grey, the fur being very soft and thick. An irregular black dorsal stripe more or less distinctly defined, running to the base of tail from the muzzle. Ears large, with white tuft or proximal base. Distinct flying membrane, black on upper edge, with white fringe. Fur of tail long, becoming black at distal extremity.

The sizes of a specimen from the Magnet Range give the following results:—Head and body, 155 mm.; tail, 165 mm.; hind foot, 22 mm.; ear, 20 mm.

Measurements of typical specimens:—(1) From Magnet Range (specimen in Launceston Museum). (2) From Mt. Wellington (specimen in Tasmanian Museum).

	Head and body.	Tail.	Hind foot.	Ear.
1.	155 mm.	165 mm.	22 mm.	20 mm.
1.	175 mm.	185 mm.	27 mm.	24 mm.

References—Thomas, Cat. M. & M. Brit. Mus., p. 156 (1888). Gould, Mammals of Australia, Vol. I., pl. 25 (1849).

This graceful animal is now to be met with in most parts of Tasmania, and we have records of its occurrence as far South as Southport. It is generally accepted that the species was introduced into Tasmania from Australia, and this belief is

based on the remarks of Gould, who wrote:—"It is a somewhat singular circumstance that, so far as we know yet, no example of this form has been found . . . in Van Diemen's Land." (Mammals of Australia, Vol. I., p. 25. Later (Vol. I., p. 28) he wrote:—"In a letter recently received from my friend, Ronald C. Gunn, Esq., he informs me that "*Acrobates pygmaeus*" does not exist in Van Diemen's Land, but the *Belideus sciureus* (*B. breviceps*?) is now not uncommon in the forests a few miles round Launceston, a number of individuals imported from Port Phillip now breeding."

It has often been questioned if the species was not indigenous to the island. Its wide distribution at the present time seems to bear out this assumption, but against this we have the observations of such keen observers as John Gould and Ronald Gunn.

### OSTEOLOGY.

Owing to the need for extreme lightness, the whole of the malar, squamosal, and mastoid regions are penetrated by air cells, which expand the width of the cranium to fifteen-twentieths of its length. The squamosal element buttresses the temporal fossa well down to the middle of the zygomatic arch, thus producing a skull so characteristic as to be quite unmistakable for that of any Marsupial of similar size.

The scapular arches are completed by well developed clavicles, the humeri are perforated by entepicondylar foramina, the humeral shafts are round, as also are those of the femora. Both sets of bones support and spread the flying membrane.

The whole skeleton is lightly, but withal strongly constructed, and departs but little from the non-flying types, showing how little the gliding habits have modified the general osteology.

### RING-TAILED PHALANGER.

*Pseudochirus cooki*, Desm.

*Phalangista cooki*, Desm., N. Diet. N.H. (2), XXV. (1817), p. 476.

Type specimen not in existence.

This species is confined to Tasmania.

General colour sooty grey, the under surfaces white. The ears are large and rounded. The fur is thick and close. Tail dark grey, white above, naked beneath. Hands and feet dark brown to black. Many colour varieties exist in collections of skins, but apparently these are more individual than otherwise. They include the whole range from nearly white to marked melanism.

Head and body	..	..	..	350
Tail	..	..	..	340
Hind foot	..	..	..	58

References—Thomas, Cat. M. & M. Brit. Mus., p. 176 (1888). Gould, Mammals of Australia, Vol. I., pl. XIX. (1856).

The "Ring-tail" is widely spread over Tasmania, and may be met with in most localities. Within recent years the rise in skin values had the effect of largely reducing the number of this species, as they are now hunted far more assiduously for their fur than they were in the past.

The "Ringtail" builds a nest either in the hollow of a eucalypt or beech, or else out in the open branches. Sometimes, as amid the thick growth of a creek bed, the bark nest will be placed in the upper branches of quite small branches only six feet or so from the ground. A nest obtained at Cleveland was largely constructed of fern fronds, strengthened by a number of small twigs, so obviously the animal is fairly catholic in his selection of building materials, as well as in the choice of sites.

## OSTEOLOGY.

The basal length of a typical skull of this animal is 65 mm., and its greater width rather than under 38 mm. The nasals are long, and project well beyond the line of the premaxilla, the average in this respect being about 8 mm. The mastoid and squamosal elements of the zygomatic arch are penetrated by air cells, the auditory meatus is circumscribed by a bony tube, ankylosed to the surrounding elements. The premaxilla are narrow and strip like, as they contribute walls to the nasal fossa. The frontal sulcus is V shaped, its edges being inflated by air sinuses; the nasals continue the frontal sulcus throughout the greater part of their length; their edges being uncurved to meet the maxillary and premaxillary rims. The interparietal regions are slightly depressed.

The Dental formula may be expressed thus:—

I.	$\frac{1.2.3}{1}$	C.	$\frac{1}{0}$	PM.	$\frac{1.0.3.4}{0.0.0.4}$	M.	$\frac{1.2.3.4}{1.2.3.4}$
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## TASMANIAN PHALANGER (Brush Opossum).

*Trichosurus vulpecula* var *fuliginosus*.

*Phalangista fuliginosa*, Ogilb., P.L.S. (1831), p. 135.

Type specimen in British Museum.

The species is found all over Australia, but the variety is confined to Tasmania.

General form stout, the fur being very long. General colour very variable from grey or rufous brown to almost black. Under surfaces much paler in each case. The tail thick and bushy, the distal extremity being naked underneath.

Measurements of two mounted specimens in the Tasmanian Museum:—

					Albino
Head and body	..	..	750	530	
Tail	..	..	390	385	
Hind	..	..	90	80	

References—Thomas, Cat. M. & M. Brit. Mus., p. 190 (1888). Gould, Mammals of Australia, Vol. I., pl. XV. (1849).

The Brush Phalanger or "Opossum" is much sought after by hunters on account of its magnificent fur, the colour of which shows very considerable variation. Black, Amber, Rufous and Grey furred specimens, together with various intergradations of colour, may all be met with. It does not nest like the Ringtail, but rests in hollow trees. This species, together with other opossums, spends a larger portion of its time on the ground than is usually supposed, but being nocturnal in habits, it is not generally noticed until it has been disturbed, in which case it immediately takes to a tree. Although these animals travel over large stretches of land, there are indications that some individuals, at any rate, of this species frequent the same localities for years. As an instance of this, we know of a splendid example of this species which is nearly always to be found at the same locality in the vicinity of Lake Fenton, National Park. In this neighbourhood there are a number of King William Pine Trees, and the Phalangers seem very fond of feeding upon the new shoots and leaves of this tree.

### OSTEOLOGY.

Although a larger skull than that of the Ring-tailed Phalanger, the salient features of that cranium are reproduced, with, however, strong generic characters super added, the most striking of which are as follows. The narrow strip-like premaxilla are here replaced by large bony plates extending backwards some 25 mm., thus forming a good half of the facial portion of the skull. The nasals are expanded to the full width of the frontal. The occipito-parietal region is even flatter than obtains in the Ringtail's cranium, the effect being that the squamosals enter into the formation of the calvarium, and nearly touch the interparietal as a general rule, and in some skulls actually do so. There are no foramina in the meseteric fossæ (small ones exist in the other skull). The basal length may be anything up to 87 mm., but 80 mm. is given as being typical. This measurement is combined with a width of 57 mm. in the actual skull here used for descriptive purposes. The dental formula, read directly from the specimen, is as follows:—

1.2.3	I	1.0.0.4	1.2.3.4
I. —	C. —	PM. —	M. —
1	0	1.0.0.4	1.2.3.4

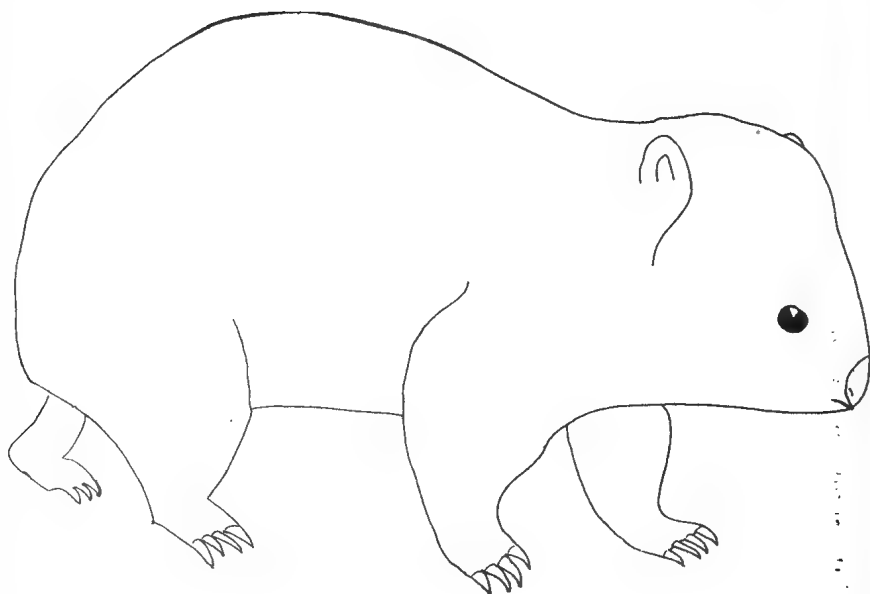
### WOMBATS.

The family *Phascologyidae* constitute an Australian type which is in many respects unique. The term "Badger" is often applied to these animals, but this is only another example of the misplaced nomenclature of the early pioneers. The only resemblance between the "Badgers" of the Old World and the Marsupial Wombats of the Australian Zoogeographical province is a somewhat superficial resemblance in general outline, and to some extent mode of living.

Without entering into biological details, it is only necessary to mention two outstanding facts, which show how erroneous it is to refer to the Australian Wombat as a "Badger." The Wombat is a Marsupial, whereas the Badger is a placental mammal, and secondly the Australian animal is herbivorous, whereas the Badger is a member of the carnivorous class.

There is room for considerable detailed research concerning the recent and extinct forms of this family, as we are of the opinion that there are interesting facts to be gleaned concerning the influence the specific characters of this family had upon the evolutionary trend of many of our typical forms.

## WOMBAT.

*Phascolomys tasmaniensis*, Sp. & Ker.

Wombat, Collins. New South Wales, II., p. 1535 (1802).

General form stout and clumsy. The fur coarse, varying in colour from dark brown to pale greyish brown. The muzzle short and thick. Ears short and rounded. Limbs sub equal, tail rudimentary.

Measurements of typical specimens:—

References—Gould. Mammals of Australia. Spencer and Kershaw, Memoir 3 of National Museum, Melbourne (1910), p. 37.

The question of the existing species of *Phascolomys* was fully dealt with by Spencer and Kershaw (1910) in Memoir 3 of the National Museum, Melbourne.

As a result of their researches they classed the existing species as follows:—

*Phascolomys ursinus*, Shaw.—The oldest known species of the genus confined to the Islands of Bass Strait, and now extinct on all, so far as is known, except Flinders Island. This is the smallest species.

*Phascolomys mitchelli*, Owen.—The largest species and the most common one on the Australian mainland.

*Phascolomys latifrons*, Owen.—Characterised by the soft silky fur, hairy thin-aurium and prominent post orbital processes. Habitat, S. Aus.

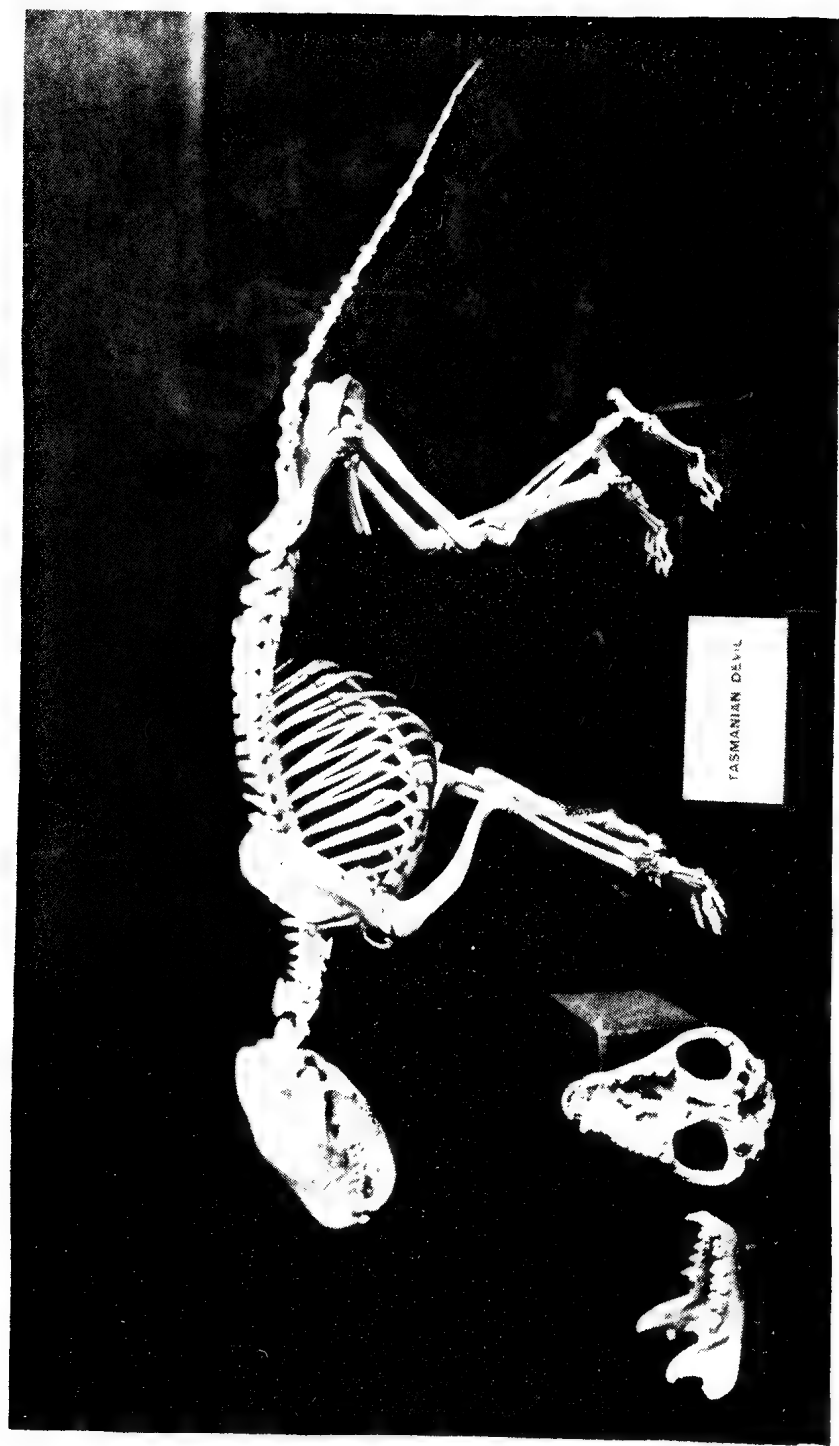
*Phascolomys tasmaniensis*, S. & K.—Size medium, intermediate in this respect between *Ph. mitchelli* and *Ph. ursinus*.





After Gould

Tasmanian Devil.



Skeleton of Tasmanian Devil

The Wombat is chiefly nocturnal in its habits, but occasionally, especially after a fall of snow, it may be seen feeding in the daytime. This species is adapted for burrowing, and its great strength and powerful digging claws enable it to make numerous burrows underground. Owing to the rough nature of the fur and the heavy skin, it is not considered of much commercial value. Generally speaking the animal is harmless and inoffensive, but it is shot on sight by trappers owing to the damage it does to their snares.

The Wombat is very strongly built, and is extremely well adapted for carrying out its underground engineering exploits. In sandy country it makes extensive burrows, but the highland representatives of this species—those that dwell away up amid the rocky summits of the mountains—are content with small caves in the rocks.

As with most of our animals, there is considerable variations as regards the colouration of the fur. The general appearance of the lowland forms is a dark brown, but often, especially at the higher elevations, the fur is a light greyish colour.

There is a small family of the Flinders Island form near Eddystone Point, on the mainland. They were doubtless introduced there.

### OSTEOLOGY.

The heavily built, wide, and depressed skull of the Wombat will never be mistaken by the student for that of any other Marsupial, and therefore a detailed description is quite unnecessary. Interested stages of growth are manifested in all skulls of the Tasmanian Wombat, whose basal lengths are less than 155 mm., which means 165 if measured between two vertical plates, and upon a true age standard. No skull that falls much below these figures is adult. The accepted type skull for this species measures only 141 mm. in basal length, and therefore extends to Wombats the conventional age standard adopted for Kangaroos, although the tooth succession is not the same. The student must therefore remember that a Tasmanian Wombat's skull whose basal length is less than 150 mm. is osteologically in about the same state of development as that which obtains in a Kangaroo's skull that has just erupted premolar No. 4, but which retains molar No. 4 in alveolus.

A Wombat kept in captivity, as a pet, till its growth had been about three-parts completed, supplied us with a skull that measured 135 mm. in basal length, but so deficient in the deposition of bony matter that it only weighed 113 grams, without the mandible, the latter turning the pan at 76 grams. If these data are compared with those yielded by a study of a matured Tasmanian Wombat skull we get the following results:—

Weight of matured Wombat's skull having a basal length									
of 158 mm. . . . .	..	..	..	..	..	..	..	..	197 grams
Weight of mandible . . . . .	..	..	..	..	..	..	..	..	122 „

In other words, a Wombat's skull nearly up to the type erected, in accordance with the conventional standard, weighs less than the jaws of a truly adult animal!

Both the skulls here used were macerated, and slowly dried for years, prior to weighing, thus making muscle, water, or skin errors quite impossible. The thanks of Australian zoologists are due to Spencer and Kershaw for the creation of the Tasmanian species of Wombat. But we still think the best interests of Osteology are not served by their acceptance of the conventional age standard.

## FOSSIL FORM.

The Wombat was represented, in pleistocene time, by at least one large animal of the genus *Phascolonus*, but exactly how many species the genus contained is at present uncertain. Remains found in the Mowbray Swamp at Smithton prove that the giant lived in Tasmania, and no doubt the future will teach us much more respecting these wonderful creatures. The late Dr. Stirling, of South Australia, in co-authorship with Mr. Zietz, is responsible for the classical Australian monograph upon *Phascolonus*. If we set the femur of a Wombat at a total length of 6 inches, for a big animal, and 16 inches for the same bone from the leg of the giant, we can form an approximate idea of their relative sizes of the two wombats—living and fossil.

## POLYPROTODONTS.

The Sub-class *Polyprotodontia* is distinguished, in the main, from the *Diprotodontia* by the fact that its members have numerous incisor teeth, there being four or five in the upper and three or four in the lower jaw on each side.

The members of this Sub-class which appear on the Tasmanian faunal list is as follows:—

- P. obesula*.—Short-nosed Bandicoot.
- P. gunni*.—Tasmanian Striped Bandicoot.
- T. cynocephalus*.—Tasmanian Marsupial Wolf.
- S. harrisi*.—Tasmanian Devil.
- D. maculatus*.—Tiger Cat.
- D. viverrinus*.—Native Cat.
- P. swainsoni*.—Swainson's Pouched Mouse.
- P. minima*.—Little Pouched Mouse.
- S. leucopus*.—White-footed Pouched Mouse.

## BANDICOOTS.

The family *Peramelidæ* includes the Bandicoots. In most localities these small mammals are to be found, but they especially favour damp situations, amid tussocky grass or small scrub. Here they form small nests of grass, and although they fall a comparatively easy prey to dogs, etc., they seem to be able to hold their own in the struggle for existence, for they are still quite common even in the settled districts. The two species which occur in Tasmania can be easily separated, as Gunn's Bandicoot (*P. gunni*) can be readily identified by the white striped markings on the back and sides.

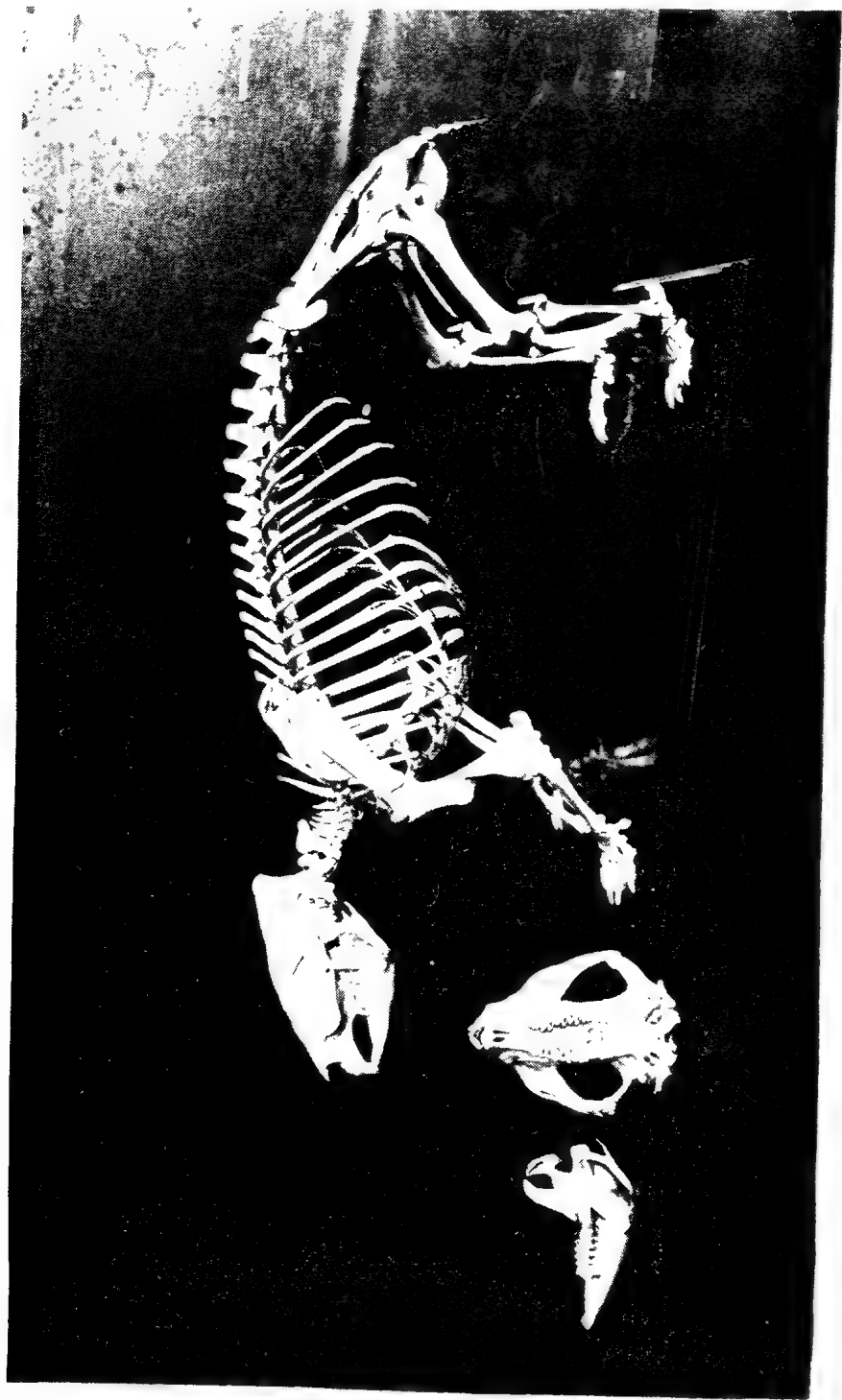
In the Bandicoots the Clavicles are absent. The pouch opens backwards, as with all marsupials which progress on all fours through the scrub.

There are usually six young.



Clare-Lord Photo

Wombat



Skeleton of Wombat.

## SHORT-NOSED BANDICOOT.

*Perameles obesula*, Shaw.*Didelphis obesula*, Shaw, Nat. Mice. (C. 1793), VIII., p. 298.

Type specimen not in existence.

Tasmanian and the Southern portions of Australia.

General form large and stout, the fur close and spiny, with softer under fur.  
 General colour brown, the under parts being greyish white.

Measurements of typical specimen:—

Head and body	..	..	..	380
Tail	..	..	..	120
Hind foot	..	..	..	75

References—Thomas, Cat. M. & M. Brit. Museum, p. 231 (1888). Gould,  
 Mammals of Australia, Vol. I., pl. 12 (1856).

The Short-nosed Bandicoot approaches the *Diprotodonts* by reason of the fact that the second and third toes of the feet are bound by an integument. The pouch, as is with most of the Marsupials which progress on all fours, opens backwards. This species appears, as a general rule, to frequent more swampy country than the striped Bandicoot. They usually feed at night, and make numerous small holes in their search for edible roots, fungi, etc.

## OSTEOLOGY.

Skulls of this animal can be readily separated from those of the Striped Bandicoot (*P. gunni*) upon basal measurements alone, as they average 64 mm. in adult skulls, the maximum being 67 mm. and the minimum 62 mm. If the cranial portion

of the skull is alone available the bullæ serve as a good guide, their size being 13 mm., as against 8 to 9 mm. in the case of *P. gunni*. A matured skull before us manifests the following dental formula:—

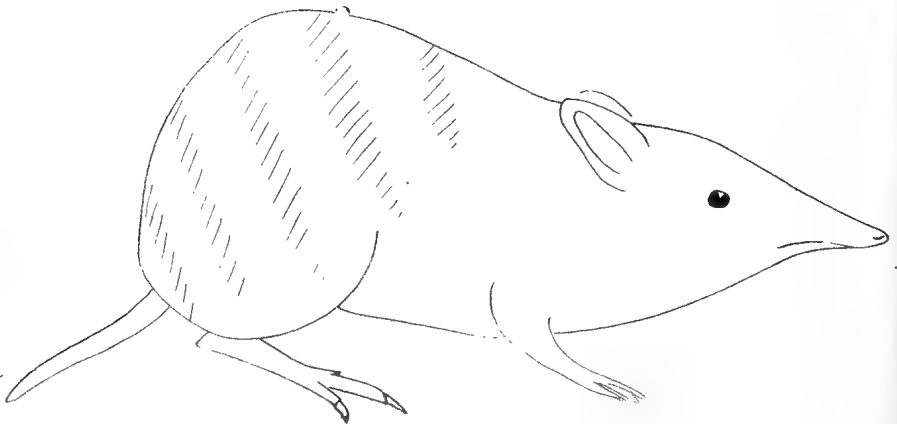
I.	$\frac{1.2.3.4.5}{1.2.3}$	C.	$\frac{1}{1}$	PM.	$\frac{1.0.3.4}{1.0.3.4}$	M.	$\frac{1.2.3.4}{1.2.3.4}$
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As the skull just named came from a female animal captured (with four young in the pouch) on March 9th, 1907, and was made the subject of a most exhaustive osteological study, that included every bone in the body, it may be of interest to copy the table of skull data recorded in our notes made at that time:—

Basal length	..	..	..	..	62 mm.
Width	..	..	..	..	30 mm. (slightly under)
Nasal length	..	..	..	..	29 mm.
Width at Maxillo frontal suture	..	..	..	..	6 mm.
Across processes of the premaxilla	..	..	..	..	5 mm.
Across naso premaxillary suture	..	..	..	..	4 mm.
Interparietal width	..	..	..	..	14 mm.
Palatal length	..	..	..	..	40 mm.
Width between molars 3	..	..	..	..	18 mm.
Basi Cranial axis	..	..	..	..	19 mm.
Basi facial axis	..	..	..	..	43 mm.
Facial index	..	..	..	..	226 mm.

### TASMANIAN STRIPED BANDICOOT.

*Perameles gunni*, Gray.





Type specimen in British Museum.

Tasmania and Victoria.

General form large and slender. The fur coarse, but not as spiny as in *P. obesula*, under fur slatey grey, thick and close. Muzzle long and slender. General colour yellowish brown, under surfaces greyish white. Upper parts more or less distinctly marked with lighter coloured bands. These markings are particularly prominent in the young.

Measurements of specimen:—

Head and body	..	..	340 mm.
Tail	..	..	110 mm.
Hind foot	..	..	65 mm.

References—Thomas, Cat. M. & M. Brit. Museum., p. 245 (1888). Gould, Mammals of Australia, Vol. I., p. IX. (1859).

The Striped Bandicoot owes its specific designation to the fact that the late Ronald Gunn, who did so much to advance the knowledge of Tasmanian Natural History, was the first to bring these species under the notice of the scientific world. Its most prominent characteristics are the white stripes which occur on the body. These are particularly noticeable in the young. It is of interest to recall that the young of the wild swine (*Sus*) of the Old World show similar striped markings.

## OSTEOLOGY.

As the skull characters of the common Bandicoot have been given in detail it is unnecessary to say much respecting the present species. The average basal length of these skulls is about 73 mm., as far as our specimens express the fact, although 75 mm. is commonly stated. In a specimen captured at Dunorlan, in which all the cranial sutures are ankylosed to extinction, the length is about 72 mm., but upon the other hand a skull of exactly the same size supplies the following sutural notes. The parietals are ankylosed into a single bone, without the slightest trace of a suture. They throw down two tongue-like stripes that separate the squamosal and par occipital elements. The interparietal is apparently crowded mesiad during life. The fossa is formed by an infolding of the cranial wall, to constitute a falx.

The dentition is similar to that of the last-named species.

## DASYURES, ETC.

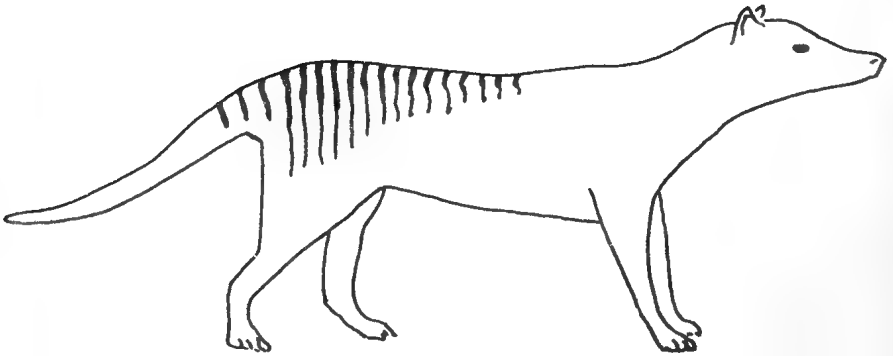
The family *Dasyurida* embraces the Marsupial Wolves, Tasmanian Devils, the so-called Native Cats, and the Marsupial Mice. The incongruity of the vernacular names imposed by the early settlers is clearly shown when we come to study the members of this family from the biological viewpoint. The popular misnomers remind one of the Biblical forecast of the wolf and the lamb, for although the species at present under review show marked taxonomic relationship, the settlers' usual nomenclature is as follows:— "Tiger" or "Hyena," "Devil," "Tiger Cat," "Native Cat," "Bush Rat," and "Mouse."

To the scientist this group is of great interest, as certain members of it show traces of very primitive types. The Thylacine or Marsupial Wolf is found now only in Tasmania, as is the Tasmanian Devil, but fossil remains of very closely

allied species have been found in other parts of the world. The so-called Native Cats, beyond their carnivorous habits, have no connection with the tribe, but the popular name has become so well known that it will probably be found impossible to displace it. The Marsupial Mice form an interesting section of this family, but further research is needed to place us in possession of many facts relating to their habits, etc.

### TASMANIAN MARSUPIAL WOLF ("Tiger").

*Thylacinus cynocephalus*, Harris.



*Bidelphus cynocephala*, Harris, T. Linn. Soc. (1808), IX., p. 174.

Type specimen not in existence.

At the present time this species is confined to Tasmania.

General character large and wolf-like. Muzzle long and slender. Fur short. General colour tawny greyish brown, below paler. The posterior part of the back is marked with 16-18 dark chocolate coloured bands. The tail gradually merges into the body, and is shorter than same. The young have more pronounced stripes and a distinct crest on the tail.

Measurements of two specimens in the Tasmanian Museum:—

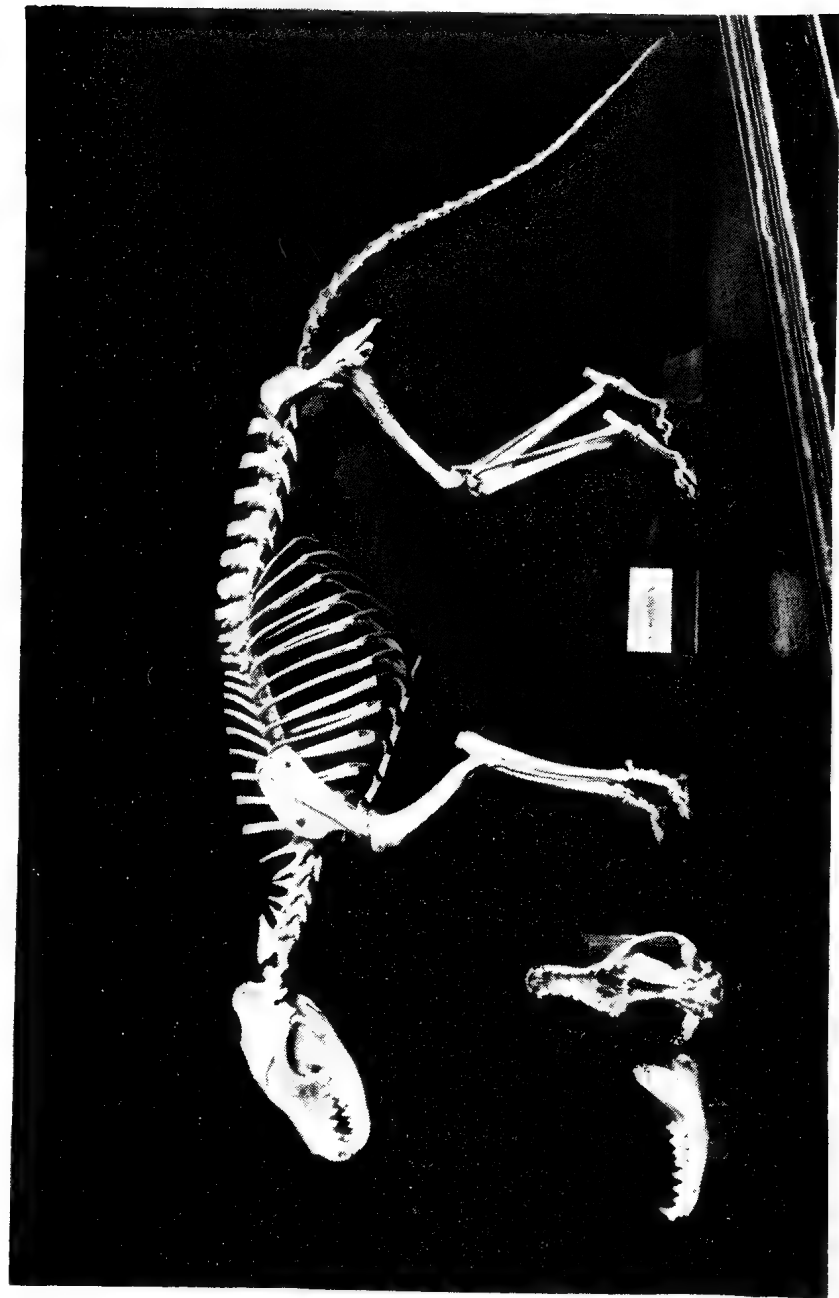
Head and body	..	1300	1230
Tail	.. ..	650	525
Hind foot	.. ..	175	155

References—Thomas, Cat. M. & M. Brit. Mus., p. 255 (1888). Gould, Mammals of Australia, Vol. I., pl. 53 (1851).

The Marsupial Wolf of Tasmania is generally spoken of by country dwellers as the "Tiger." It is in reality quite a shy animal and unless driven into a corner

E. S. Mendenhall and M. S. Wolf

$$A_{\text{HSC}} = C_{\text{HSC}}(1)$$



Skeleton of Tasmanian Marsupial Wolf (*Thylacinus cynocephalus*).

it will not attempt to attack man. In comparison with the incorrect vernacular designation of "Tiger" the scientific "*Thylacinus cynocephalus*" provides a very appropriate description as a free translation of the term is "the pouched dog with the wolf head." As soon as the early settlers introduced sheep into Tasmania the war of extermination against this interesting species commenced. The reason for this was not far to seek, for the settlers' sheep were easier to catch, and evidently considered more tasty than the wallabies and other such animals upon which these wolves usually feed. As we write these lines there is before us, in the form of a rug on the study floor the skin of a Thylacine which measures 7ft. 9in. from tip to tip, but this is an exceedingly large specimen. It is now difficult to secure complete specimens for zoological or Museum purposes, as those that are trapped usually suffer material damage.

When John Gould, the famous naturalist, was describing this species he wrote the following:—"When the comparatively small island of Tasmania becomes more densely populated, and its primitive forests are intersected with roads from the Eastern to the Western coasts, the numbers of this singular animal will speedily diminish. Extermination will have its full sway, and it will then, like the wolf in England and Scotland, be recorded as an animal of the past." The forecast of the great naturalist will soon be fulfilled unless unexpected developments occur, and it behoves all observers to gather and record all the information they can possibly obtain concerning the Thylacine.

Keen observers of this species in its native haunts have stated that when very hard pressed it will rise on its hind legs, and progress like a Kangaroo. It is of interest to note that this fact was recorded many years ago when the species was much more plentiful than it is to-day. In the "History of Austral-Asia," by R. M. Martin, published in London, 1839, the following reference occurs:—"The Hyena opossum, or tiger, is very destructive among flocks, and sometimes measures six feet from snout to tail. . . . Its mouth resembles that of a wolf, with huge jaws opening almost to the ears. The legs are short in proportion to the body, and it has a sluggish appearance; but in running it bounds like a Kangaroo, though not with such speed."

Whilst this statement bears out our belief that the animal may occasionally resort to a hopping mode of progression, it certainly overstates the case when it states that the Thylacine usually hops like a Kangaroo when running. It is only when very hard pressed that it resorts to the Kangaroo-like method of progression.

Its natural diet is the smaller mammals, wallabies, etc., but of the latter the Thylacine usually only eats certain portions, leaving the remainder to be eaten, bones and all, by the Tasmanian Devils, which usually follow in the wake of the larger animal.

Most of the daylight hours are spent by this species in some chosen cave amidst the rocks of the higher hills or mountains, and with the approach of night it sallies forth to the valleys and plains in search of prey. It cannot, however, be considered a strictly nocturnal animal, for they are occasionally seen abroad in the daylight.

As stated elsewhere, fossil remains of the Thylacine are found on the mainland, and remains of a very similar genus (*Prothylacinus*) are found in the tertiary deposits of Santa Cruz, in South America, thus affording another link in the chain of evidence in favour of the previous existence of a great connecting Antarctic Continent.

The usual number of young is four.

#### OSTEOLOGY.

As skulls of these animals have been mistaken for those of the long-nosed dogs, it may be of interest to point out the following determinative characters:—

1. The cranial portion is only half the total length of the skull; the zygoma are widely expanded, and the parietals contracted; a marked contrast to the wide brain case of the dog.

2. The lachrymal bone forms part of the face.
3. The bullæ are compounded out of the alisphenoids.
5. The pre-palatine foramina are narrow and slit-like.
4. The nasals expand as the retreat upon the skull.
6. The angle of the lower jaw is incurved.

The femur, compared with that of a dog, is lighter in build, more curved, and proximally more strongly ridged. The second trochanter is within 3 mm. of the head, compared with 7 or 8 mm. in the case of a similar sized dog. The humerus is distinctly compressed for three-quarters of its proximal length, and distally is perforated by a long entepicondylar foramen.

The dental formula is expressed thus:—

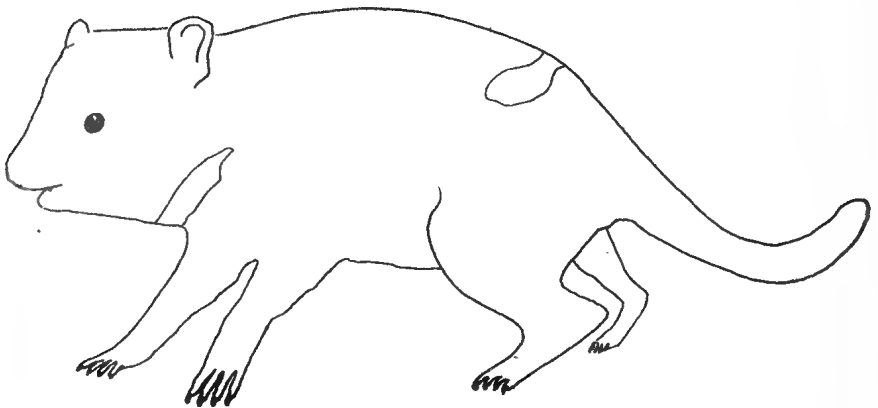
$$\begin{array}{ccccccc} \text{I.} & \frac{1.2.3.4}{1.2.3} & \text{C.} & \frac{1}{1} & \text{P.M.} & \frac{1.0.3.4}{1.0.3.4} & \text{M.} & \frac{1.2.3.4}{1.2.3.4} & \text{Total, 46.} \end{array}$$

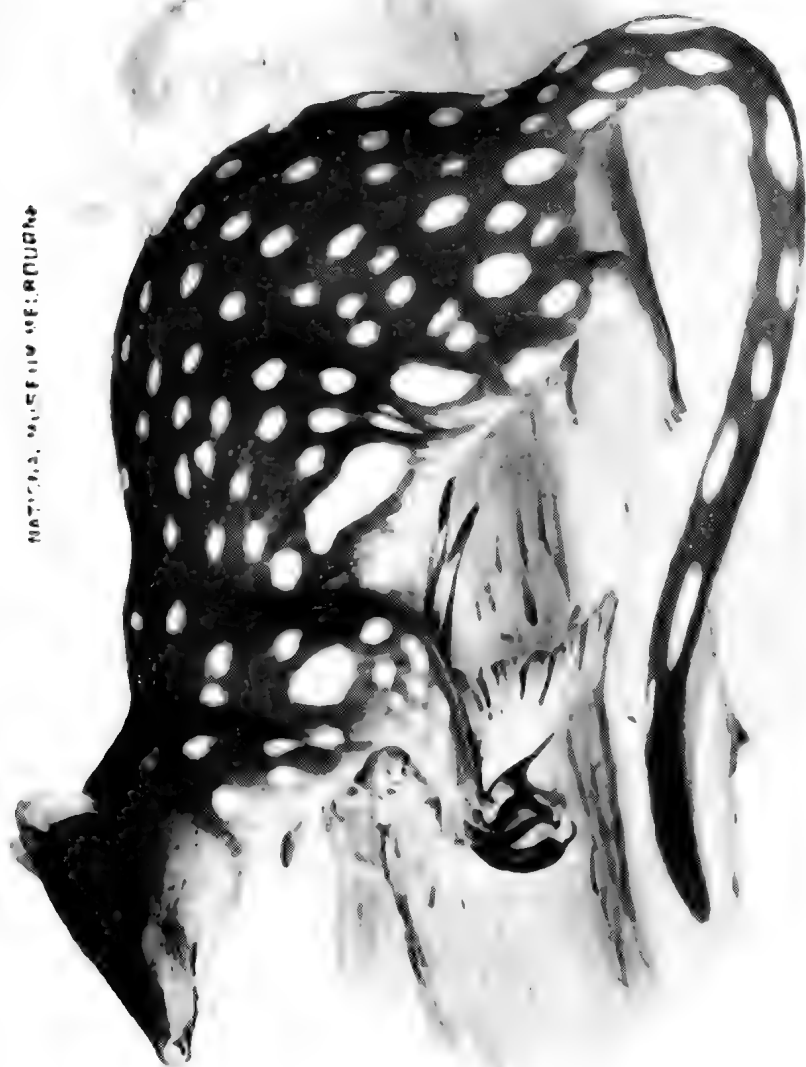
That of a dog being:—

$$\begin{array}{ccccccc} \text{I.} & \frac{3.3}{3.3} & \text{C.} & \frac{1.1}{1.1} & \text{P.M.} & \frac{4.4}{4.4} & \text{M.} & \frac{2.2}{3.3} & \text{Total, 42.} \end{array}$$

### TASMANIAN DEVIL.

*Sarcophilus harrisi*, Boitard.





After Gould

Tiger Cat.



After Gould

Native Cat.



Type specimen not in existence.

At the present time this species is confined to Tasmania.

General form stout and very powerful. Muzzle short and broad. Fur thick and close, chiefly under fur. General colour black, usually with certain white markings. These markings may take the form of a white crescent on the chest, and for irregular white patches on the back. In some instances the white markings may not be present. Ears rounded and hairy. Tail short, thick and hairy, gradually merging into the body.

Measurements of three specimens:—

Head and body	..	825	750	670
Tail	..	300	258	280
Hind foot	..	100	93	90

References—Thomas, Cat. M. & M., Brit. Mus., p. 259 (1888). Thomas, Proc. Biol. Soc., Washington, XXV., p. 116 (1913). Gould, Mammals of Australia, Vol. I., pl. XLVIII. (1851). Roberts, P.Z.S., p. 575 (1915).

Of somewhat similar habits to the Thylacine, and also claiming Tasmania as its sole habitat, yet the Tasmanian Devil differs naturally as regards general appearance and disposition. Although it has been driven from the more settled districts, yet it is not by any means in such danger of extermination as is the Thylacine. Apart from being a smaller animal, it does not cover, in its hunting range, the extent of the country that the Thylacine does. It is content to dwell in the rocky and almost inaccessible portions of bush, and, considering the extent of this class of country in Tasmania, we are of opinion that it is not in immediate danger of extermination.

We are aware that certain Zoologists are of opinion that the species is in danger of extinction, and we will readily admit that it is difficult to secure perfect specimens when required, but that is readily explained by the class of country which the species now inhabits.

The Tasmanian Devil is a very powerfully built animal and, except for the tail, the species strongly resembles a miniature bear in outline. They are generally considered to be fierce and untamable, and the impressions we have gathered from our own observations tend to support the popular idea as to their general disposition.

This view is not supported by the observations of the late Mrs. Mary Roberts, C.M.Z.S., who has kept these animals for many years in her private Zoo at "Beaumaris," which afterwards formed the nucleus of the Beaumaris Zoo, now under the control of the Hobart City Council, and excellently managed by the Curator, Mr. A. R. Reid. Mrs. Roberts, moreover, succeeded in breeding them in captivity, and claimed that the Tasmanian Devil, as regards character, is by no means as black as he is painted. Her experience tends to show that this species will respond to kindness, and show affection for its keepers. Mrs. Roberts' detailed observations are printed in the Proceedings of the Zoological Society for 1915.

The Tasmanian Devil, like the Thylacine, shows traces of its reptilian ancestry by the fact that its tail gradually merges into the body, and is not a free member, as it is in the dog, for instance. The best method of handling a devil is to grasp it by the tail, as it cannot bend its body or tail sufficiently to enable it to bite its capturer. Care must be taken, however, to get a secure hold of the tail before the animal can turn and bring its jaws into play, as, in comparison with its size, it must undoubtedly be classed with the possessors of the most powerful jaws in the world.

Fossil remains of this genus have been found on the mainland, showing that both this and *Thylacinus* had in previous times a far more extensive range than it has at present.

The usual number of young is four.

## OSTEOLOGY.

Although the basal length of the skull is 100 mm. less than that of the *Thylacine*, it is relatively much stouter in build, and the teeth of robust devils are nearly as large as those of average sized tigers. The dental formula in the present animal is not quite the same as that of its larger congener, for whereas the latter carries (as a full set) a total of 46 teeth, the devil is only furnished with 42.

The ascending rami of the mandible are remarkably different in the two animals, those of the tiger slanting rapidly backwards with an almost straight outline, while those of the devil slope but slightly backwards, and are convex throughout their course.

The humerus is pierced by an entepicondylar foramen. Put into a graphic formula the dentition may be expressed thus:—

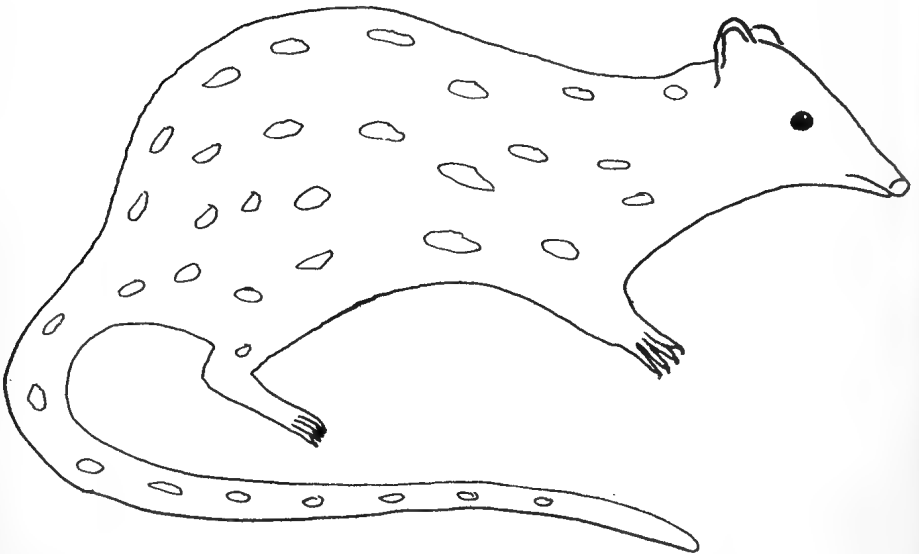
I.	$\frac{1.2.3.4}{1.2.3}$	C.	$\frac{1}{1}$	PM.	$\frac{1.0.3.0}{1.0.3.0}$	M.	$\frac{1.2.3.4}{1.2.3.4}$	Total, 42.
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The mandible of a *Thylacine*, measuring 150 mm. in total length, weighed 56 grams, while that of a devil measuring 100 mm. turned the pan at 50.5 grams.

An illustration of the stouter build of the smaller animal, better thus expressed than by any other method we know of.

## TIGER CAT.

*Dasyurus maculatus*, Kerr.



*Viverra maculata*, Kerr, Linn. A.K. (1792), p. 170.

Type specimen not in existence.

Tasmania and E. Australia.

General form large. General colour rufous, tinged orange (never black), with large white spots, which extend down the tail. Under surface yellowish white. Fur thick and close, with thick underfur. Tail very long and spotted. Hallux present.

Measurements of three species—

Head and body	..	580	570	485
Tail	..	460	400	380
Hind foot	..	85	80	70

The male is usually larger than the female.

References—Thomas, Cat. M. & M., Brit. Mus., p. 263 (1888). Gould, Mammals of Australia, Vol. I., pl. 49 (1851).

The Spotted-tailed *Dasvuse*, or "Tiger Cat," can readily be distinguished by the reddish brown colouration and the fact that both the body and the long tail are covered with white spots. The common *Dasvuse* has various body colourations and the tail is never spotted, as it invariably is in the larger species.

Beyond being carnivorous, these animals have little biological relationship to the cat tribe. The species under review is regarded as one of the settlers' greatest pests, owing to the toll it will take of his poultry. In the more settled districts, therefore, the animal has been killed out, but away in the mountain ranges and rocky gullies of the bush numbers of these animals form their homes under the stones and logs. Being a nocturnal animal, it is rarely seen, and specimens are usually secured by traps being set overnight. It is an expert climber, and takes its toll of arboreal species as well as of the smaller mammals.

About six young are reared each season.

## OSTEOLOGY.

Some large skulls of these animals attain a basal length of 105 mm., the females seldom exceeding 88 mm.

The malar, as often happens in marsupial skulls, forms a bounding wall to the glenoid fossa for the reception of the mandible. The lachrymal bone is not strongly carried on to the face, as in *Thylacinus*.

The parietals carry a bony crest; the interparietal appears upon the calvarium; and the nasals expand in the usual marsupial fashion. The ascending ramus of the mandible slopes to a similar angle to that obtaining in the skull of the Devil, but assumes the straight outline of the Tiger Wolf.

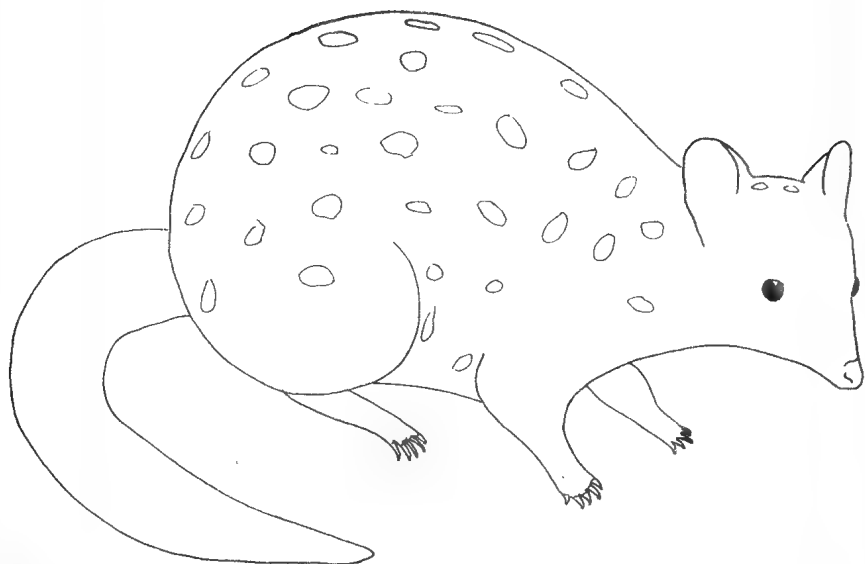
The dental formula is as follows:—

I. 1.2.3.4	C. 1	PM. 1.0.3.0	M. 1.2.3.4	Total, 42.
1.2.3	1	1.0.3.0	1.2.3.4	

Measurements of typical adult female skull—

Basal length	..	..	88 mm.
Greatest width	..	..	56 mm.
Nasal length	..	..	37 mm.
Length of Palate	..	..	50 mm.

## NATIVE CAT.

*Dasyurus viverrinus.*

Type specimen not in existence.

Tasmania, S. and E. Australia.

Form medium. General colour may be either pale yellowish grey or black, in both cases spotted with white. Tail bushy, but never spotted, the tip being white. Hullux absent.

Measurements of typical specimens:—

Head and body	..	..	..	410
Tail	..	..	..	245
Hind foot	..	..	..	75

References—Thomas, Cat. M. & M., Brit. Museum, p. 265 (1888). Gould, Mammals of Australia, Vol. I., pl. 1 (1851).

The common Dasyure or Native Cat is to be met with in many localities in spite of the warfare waged against them in return for the toll they take of the 'settlers' poultry. In this respect, however, they cannot be considered so destructive as the "Tiger Cat," which it resembles to a large extent as far as general habits are concerned.

As with the Brush Phalanger, or "Opossum," two forms of colouration are met with, and they may occur in the same litter. A dark form, which has black fur, and a light form, in which the fur is pale sandy colour. In both cases the body, but never the tail, is spotted with white.

The usual number of young that are reared at one time are six.

Fleas taken from this animal have been identified as *Uropsylla tasmanicus*, *Stephanocircus dasyuri*, and *S. simsoni*.

### OSTEOLOGY.

The skull of this species is so much smaller, that, adult specimens of average size keep well down below the females of the Tiger Cat, namely, by eight or ten millimetres in basal length. The nasals are wider in proportion to the conditions that obtain in the skulls of the larger animal, and the calvarium at its constriction is also wider, and the anterior palatine foramina are well developed.

### SWAINSON'S POUCHED MOUSE.

*Phascogale swainsoni*, Waterhouse.

*Phascogale swainsoni*, Waterhouse, Ann. Mag. Nat. Hist. (1840), p. 299.

Type specimen in British Museum.

Tasmania and Victoria.

General form medium, the muzzle being long and pointed. General colour deep rufous brown, the under surfaces being greyish brown. Fur thick and soft, with thick underfur. Ears short and broad. Palms and soles each with five (5) pads. Fore claws very long and strong. Tail about as long as body (without head).

*Antechinus niger* and *A. moorci*, of Higgins and Petterd (P. & P. Roy. Soc. Tas., 1882 and 1883) are synonymous with *P. swainsoni*.

Measurements of a typical mounted specimen in the Launceston Museum:

Head and body	..	..	155 mm.
Tail	..	..	90 mm.
Hind foot	..	..	15 mm.

Reference—Thomas, Cat. M. & M., Brit. Mus., p. 285 (1888). Gould, Mammals of Australia, Vol. I., pl. 34 (1854).

### OSTEOLOGY.

The characteristic dentition of the *Phascogales* is as follows:—

I.	1.2.3.4	1	1.0.3.4	1.2.3.4
	—	C.	—	M.
	1.2.3	1	1.0.3.4	1.2.3.4
				— Total, 46.

In a general way these creatures reproduce, upon a smaller scale, the osteological and dental characters of the better known and larger *Dasyures*. The palate is remarkable for the enormous amount of its fenestration. Owing, however, to the absence of the truly carnivorous habit of rending the prey, the parietal crest is not developed as in the larger congeners. The insectivorous diet of the animals calls, however, for a considerable jaw power, and accordingly there is no weakening of the ascending rami of the mandible. We may recall the familiar action of a dog, who, with a paw upon the bone, that is closely pressed to the ground, tears upwards at the morceau, so bringing into practical use the parietal crest and compare this with the biting and non-rending action of the cat, whose skull develops no such

crest. These little animals racing up and down the trees in search of food, as well as to seek protection, have no solid platform upon which to place their food, and consequently closely simulate the insectivora of other lands, and champ rather than rend.

Fleas belonging to the genus *Acanthopsylla* have been noted on this species.

## LITTLE POUCHED MOUSE.

*Phascologale minima*, Geoffrey.

*Dasyurus minimus*, Geoffrey, Ann. Mus. (1804), p. 362.

Type specimen in Paris Museum.

This species is confined to Tasmania.

General form small. Muzzle long and slender. General colour grey, tinged rufous. Under fur thick. Chin white, the under parts greyish, tinged yellow, the base of the hair being slate coloured. A yellow patch on outside and front of hips (generally). Hands and feet variable—grey to brown. Palms and soles naked, usually with five pads (sometimes six). Front claws long and strong. Tail short, close haired, brown above, paler below.

Measurements of a specimen in the Launceston Museum:—

Head and body	..	..	120 mm.
Tail	..	..	88 mm.
Hind foot	..	..	22 mm.
Ear	..	..	10 mm.

References—Thomas, Cat. M. & M., Brit. Mus., p. 287 (1888). Gray, Voyage Erebus and Terror Mammals, pl. XXV. (1875).

## OSTEOLOGY.

The characters hereunder given were collected from two male skulls obtained upon the West Coast of Tasmania some years ago. In general outline the skulls are nearly perfect cones, their basal lengths being respectively 29 and 30 mm. The nasals are long and narrow, and expand as they go backwards, with an evenly widening, outward curve. The maxillo-maxillary suture is in all cases a long and oblique one, cutting well into the second half of the total nasal length. The malars throw up post orbital processes that are united by any similar structures from the frontals. The magnum foramen is enormous, and absolutely similar in both skulls, and, as usually happens in such instances, the occipital condyles are widely spaced. The angles of the lower jaws are incurved in a crutch-like form, and completely embrace the bullæ. The coronoids make oblique angles; the malars bound the glenoid fossæ; and the calvaria are devoid of crests, or sutural ridges. In neither case does the total width of the skull exceed 15 mm.

## WHITE-FOOTED POUCHED MOUSE.

*Sminthopsis leucopus*, Gray.*Phascogale leucopus*, Gray, A.M.N.H. (1842), p. 261.

Type specimen in British Museum.

Tasmania and E. Australia.

General form medium and slender. Muzzle long and narrow. General colour dark brownish grey or mouse colour, under parts white. Fur thick, consisting chiefly of under fur. Ears large and broad. Palms with six pads, soles with four (4) pads, being striped transversely. Tail slender, generally shorter than head and body. The British Museum Catalogue gives the following dimensions for Cape York specimens:—

Head and body	..	..	95 mm.
Tail	..	..	86 mm.
Hind foot	..	..	19.3 mm.

It may be of interest to give the following set of measurements collected from a Tasmanian animal:—

Head and body	..	..	90 mm.
Tail	..	..	72 mm.
Hind foot	..	..	19 mm.
Ear	..	..	10 mm.

This specimen came from the Scottsdale district, and, as will be seen, it agrees fairly well in point of size with the mainland form. Our old friend, "*Rattus rattus*" has gone into such varied guises during his travels through the Tasmanian bush that some of his colour changes have palmed him off for "*R. leucopus*," but, however much the external form may simulate that creature, the excess of his tail length, over that of head and body, should be the best rough and ready test.

More work is needed, and a complete comparison of specimens from various parts of the island must be conducted before we can say with finality that a simple species covers all taxonomic characters recorded by former writers upon the subject.

References.—Thomas, Cat. M. & M., Brit. Mus., p. 302 (1888). Gould, Mammals of Australia, Vol. I., pl. 35 (1854).

## OSTEOLOGY.

In the matter of dentition the species of the genus *Sminthopsis* follow the Phascogales in having 46 teeth, arranged according to the following formula:—

1.2.3.4	I	1.0.3.4	1.2.3.4
I. ———	C.	P.M. ———	M. ——— Total, 46.
1.2.3	I	1.0.3.4	1.2.3.4

Of all living animals the "Rodents" most approach the marsupials in their osteology, and the student is constantly coming upon interesting instances of this fact. In the Genus *Sminthopsis* we get skulls of more or less rodent-like type that manifest a nearly complete absence of the essentially marsupial character of expanding the nasal bones, thus making an approach to the true rodents. Skulls of *Sminthopsis leucopus* are recorded by Mr. Oldfield Thomas with a basal length of 26 mm. for a greater breadth of 16 mm. The nasal expansion not exceeding 2/10 of a mm.

## SUB-CLASS PLACENTALIA.

The placental mammals, in point of numbers, are at their lowest ebb in the Australian zone owing to the unique marsupial fauna of the region.

They represent a higher sub-class than either the Monotremes or Marsupials. The essential difference is that the foetus is nourished for a considerably longer period, and is brought forth in a much more perfect state.

The orders represented in Tasmania are *Cheiroptera* (Bats), *Carnivora* (Seals, etc.), *Rodentia* (Rats, etc.), and the aquatic order *Cetacea* (Whales, etc.). These are exactly the representatives that would be expected, and for the following reasons. The seals are practically a cosmopolitan group as far as the Southern Ocean is concerned. The bats, owing to their power of flight, and the rodents owing to their habit of being the advance agents of any mammalian migrations, would naturally be the first forms to enter the Australian region as soon as circumstances permitted. The bats and rodents doubtless mark a southward migration of Asiatic forms. The Cetacea represent a cosmopolitan order which ranges the oceans of the world.

## Order CETACEA (Whales).

Mammals adapted for swimming. Tail in form of horizontal flukes.

## Sub-Order ODONTOCETI (Toothed Whales).

Family PHYSETERIDÆ (Sperm and Beaked Whales).

Skull asymmetrical.

## Genus PHYSETER (Sperm Whale).

45-65 ft. Head about one-third length of body. 20-30 pairs of teeth in lower jaw. Vertebral formulæ—C. 7, D. 11, L. 8, C. 24.

*Physeter macrocephalus*.—Sperm whale or "Cachelot."

## Genus KOGIA.

8-10 feet. 9-10 pairs teeth in lower jaws. Head about one-sixth of body. Vertebral formulæ—C. 7, D. 13-14, L. 9.

*Kogia breviceps*.—Short-headed Sperm Whale.

## Genus HYPEROODON.

One pair of teeth in lower jaw—in front more or less covered by gum.

*Hyperoodon*.—Sp.

## Genus MESOPLODON.

One pair of teeth in centre of lower jaw. Head with long beak. Vertebral formulæ—C. 7, D. 10, L. 10/11, C. 19/20.

*Mesoplodon layardi*.—Strap-toothed Whale.

*Mesoplodon grayi*.—Small-toothed Whale.



Genus *BERARDIUS*.

Two pairs of teeth near the front of lower jaw. Vertebral formulæ—C. 7, D. 10, L. 12, Cd. 19.

*Berardius arnouxii*.—Porpoise Whale.

Genus *ZIPHIUS*.

Two teeth near symphysis of mandible. Vertebral formulæ—C. 7, D. 9/10, L. 10-11, C. 19-20.

*Ziphius cavirostris*.—Cuvier's Beaked Whale.

Family DELPHINIDÆ (Dolphins, etc.).

Numerous teeth in both jaws.

Genus *ORCA* (Killer Whales).

18-30 feet. Teeth about 12 in each jaw. Vertebral formulæ—C. 7, D. 11-12, L. 10, Cd. 23.

*Orca gladiator*.—Killer Whale.

Genus *PSEUDORCA* (False "Killers").

15-20 feet. Teeth, 8 upper, 10 lower jaw. Vertebral formulæ—C. 7, D. 10, L. 9, Cd. 24.

*Pseudorca crassidens*.—Tas. Killer.

Genus *GLOBICEPHALUS*.

15-30 feet. Head rounded. Teeth, 9-12 in each jaw. Flippers long and narrow. Fin triangular. Vertebral formulæ—C. 7, D. 12, L. 13-14, Cd. 28-29.

*Globicephalus melas*.—Pilot Whale.

5-12 feet. Teeth, 40-65 in each jaw. Beak long. Vertebral formulæ—C. 7, D. 14-15, L. 22, Cd. 32.

*Delphinus delphis*.—Common Dolphin.

Genus *TURSIOPS*.

8-12 feet. Teeth, 22-26 in each jaw. Beak long. Vertebral formulæ—C. 7, D. 13, L. 17, Cd. 28.

*Tursiops tursio*.—Dolphin.

*Tursiops* sp.

Genus *LAGENORHYNCHUS*.

Teeth, 22-45 in each jaw.

*Lagenorhynchus fitzroyi*.

Genus *PRODELPHINUS*

Beak distinct. Fin falcate.

*Prodepinus attenuatus*.

Sub-Order *MYSTACOCETI* (Whalebone Whales).Family *BALENIDÆ*.

Rudimentary teeth, shed when young. Palate of plates of baleen or "whale-bone." Skull symmetrical.

Genus *BALÆNA*.

50-70 feet. Head two-sevenths of body. No dorsal fin. Vertebral formulæ—C. and D.L. 4, L. 10, Cd. 23.

*Balæna australis*.—Southern Right Whale.

Genus *NEOBALÆNA*.

15-20 feet. Head one-fourth of body. Small falcate dorsal fin. Vertebral formulæ—C. 7, D. 17, L. 3, Cd. 16.

*Neobalæna marginata*.—Pigmy Right Whale.

Genus *MEGAPTERA*.

45-60 feet. Head. Dorsal fin very low. Vertebral formulæ—C. 7, D. 14, L. 10-11, Cd. 21.

*Megaptera longimana*.—Hump-back Whale.

Genus *BALÆNOPTERA*.

Small falcate dorsal fin. Throat plicated. Flippers short. Vertebral formulæ—C. 7, D. 11-15, L. 12-15, Cd. 17-28.

*Balænoptera sibbaldii*.—Blue Whale.

*Balænoptera musculus*.—Common Rorqual.

*Balænoptera australis*.—Sulphur-bottomed Whale.

*Balænoptera rostrata*.—Pike Whale.

Order *CETACEA*.

The Cetacea (Whales) naturally fall into two sub-orders—the Whalebone Whales (*Mystacoceti*) and the toothed Whales (*Odontoceti*), the latter including the Dolphin family. Before proceeding to discuss these two divisions, however, it may be as well to recall a few elementary facts in relation to these interesting aquatic mammals. The mistake is often made of referring to whales as fish. They resemble fish only to the extent that they are aquatic in habit. Like all mammals, whales are warm blooded, and breathe air by means of lungs. They have no such organ as the gills of a fish. The tail is not vertical but horizontal, which fact allows the animal to plunge rapidly upward or downward.

By muscular contraction, the whole bulk of the body can be reduced, thus causing less displacement during the act of diving, while the sudden act of unrolling at great depths helps to shoot the animal to the surface. The chief muscles so employed are similar to those which a Spiny Anteater employs to roll himself into a ball. The nostrils are placed high on the head, to permit of easy breathing, and the water that appears to be thrown up when a whale "spouts" is not water discharged from the lungs, as is often supposed, but is the hot air condensing into visible vapour on reaching a cooler atmosphere. An added effect is also given on occasion owing to the whale expelling the used air from the lungs a short time before the nostrils are clear of the water. The whales store oxygenated blood, and not pure air, to keep them alive when below the surface; a marvellous series of

storage cells being provided in the vascular system for this object. The osteological features of whales offer many interesting studies. As with all mammals (with the exception of the sloths, etc.), they have seven cervical vertebrae forming the neck, but these are compressed into a shorter space horizontally than in any of the other mammals. Like the sloths also they have solid ribs, and the cartilaginous attachments are ossified to resist the pressure encountered at great depths. The ear bones are extremely hard and strong, and are only loosely attached to the skull. This explains why ear bones of whales are sometimes obtained during deep sea dredging operations.

The origin of the whalebone obtained from whales is often misunderstood. This is not "bone" in the true sense of the word, but is evolved from the hard palate. Owing to this wonderful structure the teeth have atrophied, and in certain whales have become rudimentary, and only appear in early life. As these early teeth degenerate they are replaced by long triangular plates of whalebone, set at an angle, and frayed on the inner side of the jaw. This arrangement allows the whale to progress through the water and sieve out the small animalculæ, commonly called whale food or "Brit," upon which these huge creatures feed. The animal elevates the tongue, and thus drains off the liquid through the plates of whalebone, the fringes cut out of the inner edges retaining the essential portions of the whale's diet, after which the mouth is closed, and the food swallowed.

The Whalebone Whales (*Mystacoceti*) are naturally the more valuable group commercially. Owing to the cosmopolitan nature of the Cetacean order as a whole it is a matter of difficulty to say with any degree of certainty exactly which species occur in Tasmanian waters.

The Toothed Whale (*Odontoceti*) are by far the larger group, and the division contains forms ranging from the huge Sperm Whale to the small dolphins. An interesting fact is that the skull of the toothed whales is always more or less asymmetrical.

The Beaked Whales (*Ziphiidae*) form an interesting group of the Toothed Whales. Such forms as *Hyperodon*, *Mesoplodon*, and *Ziphius* occur in Tasmanian waters, but they are seldom obtained, and not a great deal is known about them.

The family *Delphinidae* includes the fierce "Killers" and the smaller dolphins. The latter are usually called porpoises by Tasmanian fishermen, but these are, strictly speaking, dolphins. The dolphins can be distinguished by the deep grooves on the palatal surface of the maxillaries and by the larger number of teeth.

Before proceeding to discuss the species in detail there is one observation worth noting. The immense bulk of the larger whales leads to exaggerated ideas as to their length, and even when measured there is a probability of error, as the measurement may have followed the curves of the body. The only correct measurement of length is the direct distance between perpendiculars (or verticals).

## OSTEOLOGY OF WHALES IN GENERAL.

To deal with the general osteology of whales within the compass of a single article is quite impossible, and at the outset involves us in endless questions respecting the evolution of the wonderful order of Cetacea. Two main thoughts have occupied the minds of naturalists respecting the possible origin of the Cetacea, one of which traces their descent from primitive carnivora, and the other from herbivorous animals. The former idea is that most generally accepted, but no less an authority than the late Sir William Flower fought hard for the second and alternative hypothesis. Certain it is that many osteological characters found—say—in even modern ungulates are closely represented in the skulls of Dolphins, as note the following items:—

1. The loosely attached ear bones in cows and dolphins.
2. The general build of the skulls of both these animals in the temporal regions.

3. Similarity of the occiput.
4. The lateral positions of the parietals, to the exclusion of their sharing in the calvarial areas.
5. Sir William Flower regarded the "baleen" as being of similar origin to the elevations of the hard palate, so lightly developed in most animals—including man himself—but carried forward to a greater degree in the mouths of the genus *Bos*.
6. To a student, the hyoids of both dolphins and cows furnish much material for interesting reflection and study.

In spite, however, of the strong cases made out for the carnivorous and herbivorous origin of the Cetacea, we must not fail to recall the fact that similarity of conditions and needs have done such wonders towards the parallel evolution of creatures that could not possibly have kin relationships with one another, that one instinctively calls a halt, and looks to some generalised progenitor that was neither strictly carnivorous nor herbivorous in diet.

Lastly, it is by no means certain that all whales arose from a single common stock, and perhaps the best work offering itself to us to-day is to collect facts within the better defined groups, and leave it to the future to solve the problem.

In Flowers' contention he recalled the facts that whales have largely solid bones, and that the breast bones are directly attached to the rib terminals by bars of bone, and not cartilage—a condition only found elsewhere among the living and extinct Sloths, all of whom were vegetable feeders. The arrangement of the blood vessels into a *rete mirabile* is regarded by some as being directly related to the long act of submersion (upon the part of whales), and therefore the storage of highly oxygenated blood. Others, among whom were Prof. James Murie, consider it more closely related to the lymphatic system; but even so, with some function that connected it with the chemistry of the blood stream and its purification. Both sloths and lemurs manifest upon a smaller scale vascular conditions that may be termed in either case *rete mirabile*, and apparently with functions that relate to sustained effort.

### ODONTOCETI (The Toothed Whales).

The Toothed Whales are easily separated from the Whalebone Whales on account of the absence of whalebone and the presence of more or less functional teeth. The Odontoceti fall naturally into two groups—(1) The Sperm and Beaked Whales, which are almost devoid of functional teeth in the upper jaw; and (2) the *Delphinidae*, in which there are numerous teeth in both jaws.

In the toothed whales the skull is always asymmetrical, the blowhole is single.

### PHYSETERIDÆ (Sperm and Beaked Whales).

The family *Physeteridæ* includes the Sperm and Beaked Whales. In some classifications the Beaked Whales are placed in a separate family—*Ziphiidæ*. The chief characteristics of this family are that there are practically no functional teeth in the upper jaw. The teeth in the lower jaw vary considerably in number. In the Sperm Whale there are numerous strong teeth, but in certain of the Ziphioid whales the lower teeth have become almost functionless. The bones of the cranium are raised behind the nostrils in such a manner as to give the posterior portion of the skull a decidedly elevated appearance. The skull is generally more or less asymmetrical, in some cases particularly so.

The chief representative of this family is the Sperm Whale or Cachelot (*P. macrocephalus*). Our present knowledge concerning the smaller Ziphoid whales which visit Tasmanian seas is meagre, and as information is difficult to obtain it may be many years before we can speak with any certainty as regards the exact species which visit our coasts.

There are certain generalised observations, however, to which attention may well be drawn as regards these cetaceans. For instance, the *Ziphidæ* manifest a primitive character that has apparently less in common with the *Prozeuglodonts* than it has with the hypothetical ungulate progenitor of Professor Flower. This is the presence of both a malar plate (as well as the jugal style common to dolphins) and a lachrymal bone, of extensive area.

In the past ages the Ziphoid whales must have visited the shores of Tasmania as much as they do to-day, and it is of interest to note that in this connection the Miocene strata of Table Cape has yielded material relating to these whales. (See P. & P. Roy. Soc. Tas., 1913 and 1922.)

## SPERM WHALE.

*Physeter macrocephalus*, Linn.

Cosmopolitan.

Body on upper surface very dark to black, lighter on sides, and becoming greyish on under surface. Head very large, being one-third that of the whole body; it is also remarkably massive and blunt in front. No distinct dorsal fin, merely a series of humps. Single blow hole on left side of head near the snout. Teeth of upper jaw rudimentary. Teeth of lower jaw stout and strong, twenty to twenty-five on each side.

Vertebral formulæ—C. 7. D. 11. L. 8. Cd. 24.

The males grow up to about eighty feet. Females smaller.

References—Gray, B.M. Cat. Seals and Whales (1865), p. 202. Beddard, A. Book of Whales (1900), p. 192. Crowther, P. & P. Roy. Soc. Tas. (1919), p. 140.

In the early days of Tasmanian history the Sperm Whale was hunted to a large extent. In fact the *Albion*, one of the two vessels bringing the original settlement in 1803, captured three whales off the East Coast. Owing to the "bay whaling" proving sufficiently profitable for the first thirty years of the colony's history no very serious attempt was made to send vessels far afield from the main stations, though English and foreign ships had been working round the coasts from the earliest times. From the thirties onward Sperm whaling was one of the chief commercial pursuits in the colony, but owing to excessive killing the industry became unprofitable, because of the long voyages that had to be undertaken to secure sufficient oil. In 1870 the price of Sperm oil rose to £120 per tun, which caused a revival for a few years, but from the nineties onward, except for an occasional venture, nothing of importance has taken place as regards hunting this cetacean. If the industry had been properly safeguarded probably it would have provided a payable branch for commerce for many years, but the policy of immediate profits, without regard to the future was the one pursued.

The Sperm Whale derives its name from the "spermaceti," which is secreted by the species. This whale also yields the sperm oil of commerce, and ambergris is another product of the species. Ambergris is purely of pathological origin, and is probably a bilary secretion. It is sometimes found floating in the sea or washed up on the beaches. It generally contains the beaks of cuttlefish, these being the chief article of food of this cetacean. Ambergris is used in perfumery, and its value varies, but on the average may be placed at £1 per ounce. In general appearance

ambergris is a greasy substance and, especially if freshly taken from the animal, is soft, and of disagreeable smell. When warmed it has a fragrant musky smell. In the Sperm Whale only the left nostril is functional. When it "blows" the column of vapour is directly obliquely forward. This forms an easy method of identifying this species from a distance. Professor Flower wrote of the Sperm Whale:—"In no mammal does the cranium depart from the ordinary type to such an extent as the Cachelot. The expansion, elongation, flattening, and distortion of many of the cranial bones, met with in a certain degree in all cetaceans, is here carried so far as to render it by no means easy, at least in the adult animal, to recognise their homologies." In addition to the blowhole being single, it is also placed much further forward than in other members of the order.

## OSTEOLOGY.

If we confine our observations upon the skeleton of the Sperm Whale to the head we shall quickly find that we are dealing with a skull that practically stands alone in the great mammalian order. Supra-occipitally, the occiput rises almost sheer, to meet the upwardly sloping maxillary and frontal bones. This so obtrudes upon the cranial structure that the parietals, or true side walls, are practically crowded out. The lower jaws alone contain functional teeth, and the point of junction, at the symphysis, shows no bony unity, and so accordingly in dry skulls the right and left rami fall into separate moieties.

An asymmetrical condition exists in the anterior part of the skull, whereby the premaxillary and nasal bones are strongly affected, so much so that the right nasal bone has been completely absorbed.

By virtue of this arrangement the Sperm Whale, to use a sailor's term, only "spouts" a single jet.

So enormous is the skull of the Sperm Whale in proportion to the length of its body that the term *Macro-cephalus*, or large headed, has been applied as a specific name for the creature. To support this large cranium the neck is fused into a solid block of bone behind the atlas, and it is even recorded that the seventh cervical is at times joined up to the first dorsal vertebra.

The vertebral formula of the Sperm Whale is given as follows:—C. 7, D. 11, L. 8, Cd. 24; total, 50.

Ten to eleven pairs of ribs are present, the last pair, however, being rudimentary. At least a dozen chevron bones are present in the caudal regions.

## SHORT HEADED SPERM WHALE.

*Kogia breviceps*, Blainville.

*Kogia breviceps*, Blainville, An. & Phys. (18)8, II., p. 335.

Southern Seas.

General colour black above and greyish white on under surface. Head about one sixth the length of the body, blunt and short in front. Dorsal fin well marked near the tail. Flippers short. Teeth of lower jaw long, slender, and recurved, there being usually 9 or 10 pairs.

Size approximately eight to twelve feet.

Reference—Gray, B.M. Cat. Seals and Whales (1865), p. 217.

The Short-headed Sperm Whale is, as far as available records go, but an occasional visitor to Tasmanian seas. There is one mandible in the Tasmanian Museum collection, but it lacks authentic data as regards locality. The *Cetacea* in general

are a difficult group to study, as comparative material is by no means easy to obtain. Many whales that the naturalist never even hears of are doubtless stranded on the Tasmanian coasts. It is only quite recently that the British Museum has taken up the question of investigating, in a detailed manner, the whales that become stranded on the British coast. Owing to the co-operation of the coastguard stations, etc., much valuable information has been obtained, and several species which formerly were considered rare are now known to be fairly frequent visitors. The long uninhabited lengths of our Tasmanian coasts render such observations very difficult, but if they could be carried out probably it would be found that the Short-headed Sperm Whale is not as rare as is usually supposed. The Short-headed Sperm Whale bears the same relation to the giant *P. macrocephalus* as does the Pigmy Right Whale to the immense *Balaena australis*.

## OSTEOLOGY.

In its osteology the Short-headed Sperm Whale agrees with its mighty relative in having an asymmetrical nasal region to its skull, although perhaps not so strongly marked as to exclude the merest semblance of a former paired condition of the nasals. From the Ziphioid whales the animal departs in the matter of an abundance of teeth, and in having the elements of the face arch reduced in number, the malar being ankylosed to the lachrymal.

For various reasons, that cannot be gone into here, it is thought that the osteology of the whale as a whole points to its being more primitive, and therefore less specialised than the titanic Sperm Whale. The freedom of the axis vertebra and the blending of the rest of the series into a solid block noted in the Sperm Whale, here gives place to a complete ankylosis of the seven neck vertebrae. Again, the number of rib bearing vertebra is greater in Pigmy Sperm Whale than in the giant—being 14 as against 11. The complete vertebral formula is as follows:—C. 7, D. 14, L. 5., Ca. 24; total, 50.

It will be noted that the total number of vertebrae is the same in both whales, but in the more highly specialised giant Sperm whale the ribs are less by three pairs.

The teeth are found in both lower and upper jaws, but chiefly functional in the lower jaws, and present to the number of 14 or 15 upon either side. It is stated that in some cases the teeth, at the anterior ends of the mouth, are at times functional, but no such state has ever been recorded for the Sperm whale.

## HYPEROODON (Lacep.).

The genus *Hyperoodon* is (according to Beddard) distinguished by the maxillary crests, which are developed to an enormous extent in the adult males. The masethmoid is not fully ossified. There is a single tooth on each ramus of the lower jaw; also numerous small teeth, as with *Ziphius*.

Vertebral formula—C. 7, D. 9, L. 9, Cd. 18.

Considerable research has yet to be done in order to establish the exact genera and specific characters of the Ziphioid whales in general. It may be taken for granted, however, that representatives of such genera as *Ziphius*, *Hyperoodon*, *Mesoplodon*, and *Berardius* visit Tasmanian seas, but probably only at intervals.

Owing to the rugged nature of our coasts and the failure to report stranded whales to the proper authorities, it is only on very rare occasions that specimens are obtained for scientific investigations.

## OSTEOLOGY.

Before the osteology of this whale could be fully and correctly detailed it would be necessary to make comparative results from a number of specimens—both male and female—and such are not available to us.

It is obvious that the maxillary regions of the skull undergo individual variations during the period of growth, and for certain in the old males, and apparently at times in the female, the maxilla become elevated into enormous crests.

Side by side with this item of cranial morphological development, and incidental upon it, the external outline of the face changes from an approximate angle of 45 degrees to one of 85 to 90 degrees.

So curious a cranial feature as the maxillary crests, would be sure to excite wonder and attention in the event of a skull of this animal coming to hand upon our coasts. It must be remembered, however, that a second Ziphoid whale—*Berardius*—shows similar crests, though less strongly pronounced.

Apparently the spout shaped strip of cartilage, so commonly met with in Dolphins' skulls, but which in Ziphoid whales passes into the ossific stage (in some members of the family) may also ossify in this whale to form the so-called Mesthoid bone. Evidence is wanting, however, respecting a Hyperoodon in which the whole of the cartilage has passed into bone.

In conclusion, it may be noted that the Indian Fresh Water Dolphin *Platanista*, has independently evolved maxillary crests to the skull.

## STRAP-TOOTHED WHALE.

*Mesoplodon layardi*, Gray.

*Ziphius layardi*, Gray, P.Z.S. (1865), p. 358.

Southern Seas.

One compressed and pointed tooth on each side of lower jaws. The exact form of the teeth of the females needs further investigation, but in the adult males at least the teeth grow upwards and backwards, and then curve in, and sometimes meet over the upper jaw.

Length from fifteen to twenty feet.

Reference—Waite, Guide to Whales and Dolphins of New Zealand (1912), p. 16.

Owing to lack of material and specimens for examination we are unable to give detailed particulars concerning this species as regards the Tasmanian forms, but we hope to have an opportunity of studying specimens of this interesting species in the future. We are by no means sure that the characteristic strap-like teeth are a constant feature as far as the females are concerned.

Mr. Edgar R. Waite has given a good description of a New Zealand specimen which was secured at Annadale for the Christchurch Museum. The whale was a male 18ft. 3in. long, with a girth of 11ft. The colouration of this specimen was striking, the front portion being grey, and the hinder portion black. The blowhole was crescentic, with the cavity forward. The throat had one pair of grooves, which close together in front, but very divergent behind.



## OSTEOLOGY.

The osteology of this whale is best studied in such a monograph as that Sir William Flowers has left to science. Like all the Beaked Whales, any specimens available for comparison are desiderata, since even the sex, and individual variations alone, would require the presence of several full skeletons to exhaust the facts. In a general way it may be said:—

The skull does not develop crests, to the maxilla, as in the *Hyperoodon* and the mesethmoid passes into the bony stage, and may even involve the surrounding intermaxillary bones, in the process thus converting the whole of the skull beak into a solid bony mass. Sex variations may account for those specimens that fail to ossify the mesethmoid, at maturity, but where immaturity is evident no other cause need be looked for. Sir William Turner, in his report upon the Cetacea collected by H.M.S. Challenger, figures two skulls of these Strap-toothed whales, one with complete and the other with incomplete ossification of the rostral cartilage.

The nasal bones are much reduced in length, and the neural spine of the axis vertebra roofs over the second crevice to which it is ankylosed. This latter character is of family import, extending beyond the limits of the present genus.

Quite recently Mr. E. R. Waite, Director of the South Australian Museum, has published an account of a specimen of this whale that came ashore in Lacedæ Bay. Writing of this animal's skull, Mr. Waite says:—"The skull is generally symmetrically formed, the anterior narial portions alone being twisted to the left side." He then goes on to state that "the lateral rostral groove, commonly described as being slightly developed, is quite a feature in this young specimen." Thus again showing our need for notes upon individual development.

## SMALL-TOOTHED WHALE.

*Mesoploden grayi*, Haast.

*Mesoploden grayi*, Haast, P.Z.S. (1876), p. 7.

General colour black. Snout pointed and beak shaped. Under surfaces paler. Dorsal fin falcate and large. Pectoral fins small. "Possesses a mandibular tooth at the posterior edge of the symphysis, either hidden below the gum or standing conspicuously above it, according to age or sex." "Both sexes possess permanently in the upper jaw a row of small conical teeth with the apex slightly incurved, which, although only rooted in the gums, have to perform important functions in the nourishing process of the animal." (Haast.)

Length, up to 20 feet.

Reference—Haast, P.Z.S. (1876), p. 7 and p. 475.

This small toothed *Mesoploden* was first described by Dr. von Haast in the P.Z.S. for 1876 (p. 7). He later (p. 475) suggested the generic name *Oulodon*, as he considered the small teeth on the upper jaw was sufficient evidence upon which to base a generic distinction, but von Haast's contention has not survived. Much yet remains to be learnt concerning the specific, sex and age variations of the odontography of the Ziphoid whales in general.

## OSTEOLOGY.

No very extensive osteological characters for the determination of this whale exist, its original generic and specific characters related to the tooth line, and the fact that some nineteen teeth were found in the upper jaws, upon either side, none of which were set in sockets.

The drying of a skull, and hence the removal of such teeth in the gum substances would remove these determining factors for ever from a beach-worn specimen, and only leave the somewhat doubtful characters found in the following table:—

1. Rostrum narrow at the base.
2. A basirostral groove present.
3. Foramina of the fifth pair of nerves, one behind the other.
4. Tooth vertical near hinder end of symphysis.

As most of these characters appear in some one or other of the Ziphoids the osteology of this whale yet awaits a monographer.

Mr. E. R. Waite records a right mandibular ramus of this whale, as having been discovered on Kangaroo Island, South Australia, so any day may see the stranding of a specimen that will set at rest the many questions relating to its osteology.

## PORPOISE WHALE.

*Berardius arnouxii*, Durvernoy.

Southern Seas (?)

General colour velvet black. Under surfaces paler. Two pairs of teeth near the front in each mandible.

Vertebral formula:—C. 7, D. 10, L. 12, Cal. 19.

Length, up to 35 feet.

References—Beddard, Book of Whales (1900), p. 228. Waite, Whales and Dolphins of N.Z. (1912), p. 15.

Although we have no positive and direct evidence of this species from Tasmanian seas, we are of opinion that it visits our coasts. Among our notes relating to stranded whales many items of which are naturally vague, being merely the impressions of fishermen and others who have casually viewed a carcase on the shore, there is some evidence which at any rate raises a suspicion that specimens of this species occasionally are stranded on the Tasmanian coasts. As with the other Ziphoid whales, we have much information to glean, and if these remarks will lead to any specimens that have become stranded being identified and reported immediately to the nearest museum, they will have fulfilled their purpose.

## OSTEOLOGY.

The skull of this whale is said to be most remarkably symmetrical for a toothed whale, and the nasal bones are less depressed than obtains in *Mesoplodon*. Very little asymmetry is to be found, however, in *Mesoplodon* itself, as will be sure to strike a student the moment he handles one of these latter skulls.

The vertebral formula is as follows.—C. 7, D. 10, L. 12, Co. 19; total, 48.

As with the majority of the Dolphin family, the first two vertebræ of the neck are ankelosed together, but the remaining five are either quite free, or the third crevical may be united by its centrum. In these characters the cervicals of this Ziphoid whale make but little departure from any similar sized cervical block, from a dephinoid whale, except that the neural spine of a Ziphoid "axis" is always more extensive than those of the Delphinidæ.

## CUVIER'S BEAKED WHALE.

*Ziphius cavirostris*, Cuvier.

*Ziphius*, Cuvier, Oss. Foss., V., 350.

Cosmopolitan.

Colour variable, usually dark above and light on under surface. One pair of teeth in the lower jaw, the teeth being situated near the front.

Vertebral formula—C. 7, D. 9-10, L. 10-11, Cd. 19-20.

Length, up to thirty feet.

References—Beddard, Book of Whales (1900), p. 233. Scott & Lord, P. & P. Roy. Soc. Tas. (1919), p. 23.

Cuvier's or the Goose-beaked Whale is a cosmopolitan species, and *Z. cavirostris* forms the only species of the genus, but a very large number of synonyms have to be merged into typical form. Beddard gives the following list, which gives an idea of the involved synonymy which is so typical of the cetacean order in general:

*Ziphius chathamensis*, Hector.

*Ziphius novæ-hollandiæ*. Haast.

*Ziphius indicus*, van Beneden.

*Ziphius australis*, Burmeister.

*Petrorchynchus capiensis*, Gray.

*Ziphius grebnitgkii*, Stegner.

*Hyperoodon semigranctus*, Cope.

*Hyperoodon docemetii*, Gray.

*Hyperoodon gervaisii*, Duvénoy.

*Delphinus desmarestii*, Risso.

*Delphinus philippi*, Cocco.

*Ziphiorhynchus cryptodon*, Burmeister.

and apparently some others.

## OSTEOLOGY.

The skull of this whale was figured in the Proceedings of the Royal Society of Tasmania for the year 1919, and as it is a Tasmanian specimen, the notes there given will relate to it. In America the ceteologist True published notes upon a series of such whales, and Mr Herbert Longman has recorded the animal as appearing in Queensland waters.

Possibly Cuvier's whale is more common than we are apt to suppose, and when once attention is called to the necessity for recording stranded whales much valuable material will become available to students.

The skull is about 35 inches (890 mm.) long, the extreme measurement taking into account the fact that the lower jaw extends at the tip of the beak beyond the upper. Its greatest width is  $19\frac{1}{2}$  inches (485 mm.). The overhanging compound nasal bosses will serve to distinguish this skull from that of *Berardius*. While its shorter and stouter build will segregate it from *Mesoplodon*.

Like all the Ziphoid whales, the skull of this creature has a perfect zygomatic arch, the jugal style malar plate, and distinct lachrymal bone being present. This, of course, does not mean that the zygomatic arch has not undergone vast changes, as obtains in all dolphins, and larger whales, but simply that the separate elements named are still easily traced. For complete table of measurements see the Papers and Proceedings of the Royal Society of Tasmania for 1919.

### DELPHINIDÆ (Dolphins, etc.).

The *Delphinidæ* are a cosmopolitan family, and embrace the Killer Whales and the Dolphins. The characteristic feature of the group is the presence of numerous teeth in both the upper and lower jaws, the teeth being of conical and simple character. Practically all the representatives (with the exception of the Killer Whales) are of small size.

#### KILLER WHALE.

*Orca gladiator*, Bonn.

##### Cosmopolitan.

General colour dark above, with variable white patches under surface, mostly white. Usually a white patch behind the eye. Dorsal fin near the middle of back, high and pointed. Teeth very massive, recurved and pointed, usually twelve in each side of both jaws.

Vertebral formula—C. 7, D. 10, L. 9, Cd. 24.

Total length, up to 30 feet.

References—Gray, B.M. Cat. Seals and Whales (1865), p. 279. Scott & Lord, P. & P. Roy. Soc. Tas. (1919), p. 1.

The Killer whales, or "the wolves of the ocean," are cosmopolitan in habit. They are the giants of the *Delphinidæ*, and being powerful and rapacious they will attack anything in the sea. They even attack large whales, their powerful recurved teeth giving them a great advantage. They usually hunt in packs, and are very fast swimmers. The large pointed dorsal fin and their distinctive colouration serve to identify the species.

#### OSTEOLOGY.

From the fact of this whale being a carnivorous animal, the authorised check upon the seal and whale families, its skull is most wonderfully built, contributing all that its habits demand, namely:—

- (1) Wonderful jaw power.
- (2) Powerful teeth.
- (3) Great alveolar and therefore rooting areas.
- (4) Extensive muscles for working such jaws



Tasmanian Museum

Skull of Killer Whale (*Orca*).



Skeleton of *Pseudorca*.

The whale itself is a rapid swimmer, is possessed of tireless energy, and these combine with its beautifully poised skeleton to make it the most perfect check upon the undue increase of the whale order that can be imagined.

The titanic fights indulged in by these killers is often noted in the mutilated ribs that one comes across when dealing with their skeletons.

Orcas skulls reach a length of three feet and several inches over in large specimens, and constitute the most powerful of all the skulls found in the Dolphin family. In a general way they conform to the true dolphin type, but may be said to carry that type to its extremest point in all that relates to roughening for muscular attachments and the building up of overlapping bones in the way of ossific ridges and bosses.

The only skull likely to be confounded with that of the *Orca* in point of size is that of *Globicephalus*, but this latter has much weaker teeth, their number being 12, as against 10, found in the jaws of the *Orca*.

## TASMANIAN KILLER WHALE.

*Pseudorca crassidens*, Owen.

*Pseudorca crassidens*, Owen, Bri. Foss. Mamm. (1846), p. 516.

Cosmopolitan.

General colouration black above and whitish grey below. The dorsal fin small and falcate. Teeth of similar character to *Orca*, but smaller. Usually eight in upper jaw, and ten in mandible.

Vertebral formula—C. 7, D. 11, L. 12-14, Cd. 28-29.

Length, about fifteen feet.

References—Flower, P.Z.S. (1864), p. 240. Trans. Rec. Mem. Cetacea Roy. Soc. (1864). Scott & Lord, P. & P. Roy. Soc. Tas. (1919), p. 7.

The Tasmanian form of this species was originally described as *Pseudorca meridionalis* by Professor Flower in the Proceedings of the Zoological Society, 1864, but the cosmopolitan nature of the species has now been recognised, and Professor Flower's designation reverts to the rank of a synonym. The history of the species is of interest, as Owen originally described it from a skull found in the Lincolnshire fens. This was considered an extinct species until specimens were secured in the North Sea. The coasts of Tasmania yielded the next specimens, and thus its cosmopolitan range proved.

## OSTEOLOGY.

A complete skeleton of this whale is available to students, the skeleton being articulated, and exhibited in the Tasmanian Museum at Hobart. A full account of its osteology will be found in the Proceedings of the Royal Society of Tasmania for the year 1919.

The total length of the skeleton is 14 feet 6 inches, with a skull of 24 inches. Skulls and skeletons generally of this whale are easily confounded with those of the 'Pilot whale' (*Globicephalus*), therefore the following characters should be kept in mind when handling bones from either of the two animals.

1. In *Globicephalus* the maxillary wings cover the frontals upon all their exposed surfaces, except for a narrow strip at the vertex.
2. In *Pseudorca* the frontals are exposed all round for anything up to three-quarters of an inch.
3. In *Pseudorca* the nasals are small and closely adpressed to the vertex.

As to the skeletons it may be noted that an immature *Globicephalus*, in which all the epiphyses were open, and quite free, the skull would be as large as that of a fully adult *Pseudorca*. To distinguish the false from the true Orca's skull, if the teeth are available, the following comparative data will be useful:—

Largest tooth of *Pseudorca* 1 inch long. Orca=2 inches.

Girth of *Pseudorca*  $3\frac{1}{2}$  inches. Orca= $3\frac{1}{4}$  inches.

The parietal and squamosal moieties of the *fossa temporalis* in the *Pseudorca* are quite unlike those of the true Orca. The squamosal contributes a narrow, nearly even strip about two inches wide, set at an angle, and this is continued nearly up to the vertex.

In the Orca the squamosal is wide and very irregular as a rule, but, of course, variations may be met with.

In the skeleton five of the cervical vertebræ are fused together, the last two being quite free.

A skeleton of this whale in the Dominion Museum, Wellington, is apparently one that hailed from the Tasmanian coasts.

## PILOT WHALE.

*Globicephalus melas*, Traill

*Globicephalus melas*, Traill, Nicholson's Jrn., XXII. (1809), p. 81.

Cosmopolitan.

General colour black, the under surfaces slightly paler, and with white markings on throat and abdomen. Teeth, 11-12 in each jaw.

Vertebral formula:—C. 7, D. 12, L. 13-14, Cd. 28 29

Length, up to twenty-five feet.

Reference—Scott & Lord, P. & P. Roy. Soc. Tas. (1919), p. 13.

The Pilot Whale, or Grampus, is often termed the Blackfish, but the latter term is used indiscriminately for many of the smaller Cetaceans. It is usually found in shoals, and on occasions large numbers become stranded upon the coast.



## OSTEOLOGY.

Having used the skull of this whale for comparison with that of *Pseudorca* it will be unnecessary to do more than briefly state its size, etc.

Greatest length, 26 inches.

Height,  $13\frac{3}{4}$  inches.

Width at notch,  $10\frac{1}{2}$  inches to 11 inches in some specimens.

Width of fossa temporalis, 5 inches.

Height of fossa temporalis,  $5\frac{3}{4}$  inches.

If an examination of the palatal aspect of one of these skulls be made it will be seen that the intermaxillaries only obtrude upon the palatal surface for three inches, as against fourteen inches for the *Orea*. For further details see our paper upon this subject in the Papers and Proceedings of the Royal Society of Tasmania for 1919.

Upon page 16 of the Report cited an extensive table is given to enable the student to compare adult male and female skeletons of these whales with those of immature animals.

## COMMON DOLPHIN.

*Delphinus delphis*, Linn.

*Delphinus delphis*, Linnaeus, Syst. Nat. (1766), p. 77.

## Cosmopolitan.

General colour above black, the sides grey, merging to white on the under surface. The flukes of the tail black. In immature forms under surfaces are distinctly yellowish in colour. Teeth, 40-65 in each jaw.

Vertebral formula—C. 7, D. 14-15, L. 22, Cd. 32.

Length, up to twelve feet, usual length from six to eight feet.

References—Beddard, Book of Whales (1900), p. 255. Scott & Lord, P. & P. Roy. Soc. Tas. (1920), p. 1.

The cosmopolitan dolphin is very common around the Tasmanian coasts and in the estuaries of the larger rivers, sometimes ascending them for many miles from the sea. Although a good idea of the swimming powers of these aquatic mammals may be obtained by watching them from steamers, etc., it needs further experience than this before one fully realises the enormous power of these cetaceans in their natural element. During the currency of the Easter (1920) Camp of the Tasmanian Field Naturalists' Club at Port Arthur we were fortunate in seeing a number of Dolphins in Maingon Bay. There were several hundreds in the bay, and their evolutions in the surf were watched with interest. It appeared as if the animals were mating. The greater majority kept out in the waters of the bay, but every now and then a score or more would come dashing towards the shore, where the ocean rollers broke, rank after rank, upon the coast. The outlines of the Dolphins could be seen plainly in the incoming breaker, and just as the wave was about to break, and it appeared as if the dolphins would be cast ashore, they would turn suddenly, dive through the crest of the breaker, spring several feet into the air, and once more swim seawards. It needs actual observation of such a sight as this before one fully appreciates the swimming powers of the dolphins—the so-called "porpoises" of the Tasmanian fishermen.

Although it is here assumed that the modern method of reducing all the smaller dolphins to a single species (that of the type) is a more or less wise one, yet there are several minor objections to be overcome. For instance, *Delphinus fosteri* is generally considered a synonym of the species under review, yet it does not appear to agree with the large eight feet dolphins which frequent our coasts. Yet too minute details should be disregarded, for the more one studies the Cetacea the more the conviction grows that we are dealing with a rapidly evolving order of marine mammals, and that within certain limits, taxonomy is tentative, and certainly unworkable is pushed to extremes.

## OSTEOLOGY.

The elongation of Dolphins' skulls to carry so extensive a dental apparatus, as shall comprise anything up to two hundred teeth, generally serves to distinguish these skulls from those of any other similar whales.

If any confusion arises, it is usually by virtue of extending the really restricted name "Porpoise" to the true dolphins.

Dolphins' skulls may be easily separated from those of porpoises by the teeth alone, as the total found in these skulls is about half of the total number present in a Dolphin's skull.

An extensive analysis of the whole osteology of Tasmanian Dolphins will be found in the Proceedings of the Royal Society of Tasmania for the year 1920. Of skulls alone a table of contrasted measurements, collected from the study of nine specimens is given, and in other cases the several parts of the skeleton are compared.

In the Launceston Museum a detailed skeleton of an animal of this species of eight feet in length is compared with an immature animal of five feet, every bone and process, in either skeleton, being named and described, while splendid skeletons are available to students at the other end of the island in the shape of articulated skeletons placed on view in the Tasmanian Museum at Hobart. In these circumstances the need for extensive notes upon the osteology of *Delphinus delphis* hardly exists in this country.

## FITZROY'S DOLPHIN

*Lagenorhynchus fitzroyi*, Waterhouse. (*D. cruciger*, Quoy & Gaim.)

*Lagenorhynchus fitzroyi*, Waterhouse, Zoo. Beagle, Mamm., p. 25 (1839).

Beddard defines this genus thus.—

"Head with short, not very distinct, beak. Dorsal and pectoral fins falcate. Teeth small, 22-45 in number in each jaw. Vertebrae 73-92. Pterogoids separate or in contact. Rostrum not exceeding, or hardly exceeding, length of beak."

The species *fitzroyi* is defined as having a total length of 5 to 6 feet, with a short beak, and large dorsal fin. Teeth 28.28—28.28—112.

This species is at times seen upon our coasts, and a stuffed specimen is available to us. Apparently these little whales enter and ascend our rivers at times, and possibly the vernacular name "Porpoise" could hardly be bestowed more fittingly than upon these creatures, for to all external appearances they simulate the English porpoise. Nevertheless they are true dolphins, and not porpoises.

Gray gave as measurements for one of these animals the following:—Total length, 5ft. lin.; length to fin, 2ft. lin.; width of tail, 1ft. 2ins. These data agree very well with our specimen

### OSTEOLOGY.

We have no skulls that can with certainty be relegated to this whale. The stuffed specimen is all the data we possess. When this creature was mounted as a Museum specimen the work was done away from the institution and no skull notes were collected. Also it was thought to be quite a common Tasmanian cetacean, but curiously enough no other specimen has since reached us.

Will lovers of natural history keep a look out for remains of this little creature upon our shores?

We may expect to find the skull having a total length of about 15 inches, with jaws some three inches shorter, and a cranial width of about 7 inches.

### TURSIOPS.

*Tursiops tursio*, Fabricius.

*Tursiops tursio*, Fabricius, Fauna Greenland (1780), p. 49.

Cosmopolitan.

Upper surfaces and sides deep black or lead colour, which gradually passes into slate colour or greyish white on under surfaces. Under surfaces and flippers marked with longitudinal blotches of dark lead colour. Teeth, 22-26 in each jaw.

Vertebral formula—C. 7, D. 13, L. 17, Cd. 18.

Size up to 12 feet.

References—Beddard, Book of Whales (1900), p. 275. Scott & Lord, P. & P. Roy. Soc. Tas. (1919), p. 96.

The genus *Tursiops* should not be confounded with that of *Tursio*, which latter genus, with very little readjustment, might well be relegated to mere specific rank, for it is closely involved with other genera—for example, *Prodelphinus*. Since Gray (P.Z.S., 1862) published his account of *T. catalania* it has been usual to show this as the species of *Tursiops* inhabiting Tasmanian seas, but in 1919 we contributed a paper to the Royal Society of Tasmania which showed that the Tasmanian form was undoubtedly the typical *Tursiops tursio*. There is also some evidence in favour of a second species. If it should be proved to exist, we are of the opinion that it will be shown to have a curious twisting of the neural spines of the lumbar vertebræ, and the moderate length of some eight feet odd. Twice we have traced evidence in this direction, but need more data before making a definite pronouncement.

The males of this species closely approach the size attained by the females of the genus *Globicephalus*, and although the maximum size has yet to be recorded it is certain that they reach eleven feet. The females appear to be considerably less than ten feet in length as a general rule.

### OSTEOLOGY.

Tasmanian students have fine comparative skeletons of this Dolphin (comprising male and female animals) available for study by visiting the Museums at Hobart and Launceston. Also a detailed description can be consulted in the Papers and Proceedings of the Royal Society of Tasmania for the year 1919.

Males of this genus approach very closely in point of size the females of *Globicephalus*, ranging up to eleven feet for certain, and possibly over twelve. Their skulls measure up to 21 inches, as against 19 inches for the females of their own genus. In a general way the female skulls are lighter in the items of super ossification of muscular attachment surfaces, especially at the notch, the intermaxillaries are less curved in profile, and the mandibles are a full inch shorter at least than those of the male, although the actual cranial portion of the skull may be quite as large as obtains in male specimens.

In two specimens in our collection the females' lower jaws are  $16\frac{1}{4}$  inches for a skull length of 21 inches. On the other hand, the palatal length in a middle line is in both male and female  $12\frac{3}{4}$  inches, the brain cases have similar widths of 10 inches, and the extent of the tooth lines yield measurements of 10 inches each. The tooth formula may be given as follows:—24.24, 24.24—92, with individual variations that may range from 90 to 1000. This puts *Tursiops* nearer to the porpoise than to the common dolphin, and other skull elements also support this.

## DELPHINUS.

### *Prodelphinus*, Gray.

All the Dolphins of this genus have a distinct beak, and the dorsal fin is falcate—following in this respect the outline of the pectoral limbs.

Vertebral formula—C. 7, D. 14 15, L. 22 (vary from 19.21 in specimens), Cd. 29-30—69.81.

Tasmania boasts of at least one species of this genus, namely, *Prodelphinus attenuatus*, Gray. This animal is, in common with most Dolphins, dark above, and more or less dirty white below. Its dental formula is from 35 to 44, most Tasmanian specimens exceeding the lower number. Beddard states the vertebrae amount to 81, of which 15 are dorsal.

No recent captures of this whale have been recorded, and our material, which does not run to complete skeletons, dates from Dr. W. Crowther's day.

Apparently *Dolphinus pseudodelphis*, *Steno cappensis*, and *Clymene punctata* are identical with this species.

Fine skulls are in the collection of the Dominion Museum at Wellington, New Zealand, as also some of the smaller species *Euphrosyne*, but of this latter we have no Tasmanian specimens, although possibly it appears at times off our coasts.

## OSTEOLOGY.

The skulls in many ways simulate those of the genus *Delphinus*. They are, however, flatter in the narial regions, and the palate is not grooved. We have collected a series of osteological notes from skulls of this Dolphin, but at present they await publication.

In addition to the absence of the palatal grooves, the palato-pterygoid ridge is twice the width of that found in *Delphinus*.

Skulls without mandibles reach a length of 414 mm. Immature animals of 355 mm. in length are among our specimens.

If the above facts are kept in sight the skulls of this Dolphin may always be recognised.

## MYSTACOCETI (The Whalebone Whales).

The Whalebone Whales are immediately recognised owing to the absence of teeth (which are shed in the early stages of growth) and the presence in their place of plates of "whalebone" or baleen. The baleen, which is the "whalebone" of commerce, consists of a series of triangular curved plates, which are frayed at their inner edges in order to sieve out the food of these aquatic giants, as they feed upon the minute Pteropods and Crustacea. Gathering their food as they go through the water, the immense mouths of this division of the *Cetacea* serve an excellent purpose, and by closing the large jaws and raising the tongue the water is strained off, and the food left upon the inner frayed edges of the baleen, and is then swallowed. The throat of the whalebone whales is exceedingly small, and will permit the passage of the smallest objects only.

### SOUTHERN RIGHT WHALE.

*Balaena australis*, Desm.

*Balaena australis*, Desmoulins, Dict. Class d'Hist. Nat. (1882), II., p. 161.

Cosmopolitan (excepting the localities frequented by the True or Greenland Right Whale).

General colour blackish grey to black. Rest of throat and under surface white. Head large, the skin of the throat being smooth. Baleen long, elastic, and black in colour. No dorsal fin.

Vertebral formula C. 7, D. 14, L. 10, Cd. 23.

Length, 50-70 feet.

References—Beddard, Book of Whales (1900), p. 133. Crowther, P. & P. Roy. Soc. Tas. (1919), p. 130.

As has been repeatedly pointed out during the course of our notes on the *Cetacea*, the order is a difficult one to study, and the question of species a very involved one. As regards the Right Whales (*Balaena*) the position is just as difficult as with many of the other species. Both Flower and Beddard inclined to the belief that apart from the True Right or Greenland Whale, the only other *Balaena* is *B. australis*, and for this species Beddard (1900) gave the following synonymy:—

*B. biscagensis*, Gray

*B. japonica*, Gray.

*B. antipodarium*, Gray.

*B. mediterranea*, Gray.

*B. nordcaper*, Gray.

*B. sieboldi*, Gray.

*B. antarctica*, Schegel.

*B. angulata*, Gray.

*B. capensis*, Gray.

*B. cisarctica*, Cope.

*B. eubalena*, Flower.

*B. tarentina*, Capel'ini.

*B. alutiensis*, van Beneden.

*B. kuliomoch*, Chamisso.

*Hunterius temminckii*, Gray.

*Hunterius swedenborgi*, Liljeborg.

*Macleayius australiensis*, Gray.

*M. britannicus*, Gray.

*B. cullamacha*, Chamisso.

The Southern Right Whale was once fairly plentiful in Tasmanian waters, but excessive hunting has reduced its numbers to a very considerable extent, and whaling, as a Tasmanian industry, is now non-existent. This species is the most valuable commercially of all the Southern Cetaceans, and yields as much as 9 tuns (tun = 252 gals.) of oil and 5 cwt. of whalebone.

These whales used to frequent the coasts from about May to September, and it was largely due to these periodical visits that the system of Bay whaling was established. The whalers were not concerned with scientific classification, and it is often difficult to know, when reading old records, exactly which species is intended, but the Southern Right Whale (*B. australis*) was usually called the "Black Whale." This must not be confused with "Black Fish," as the latter term was used indiscriminately for all the smaller cetaceans.

In "An account of whaling at the Derwent," by William Collins in 1804 (Hist. Rec. Aust. Ser., III., Vol. I., p. 276), it is stated *inter alia*:—"The Black Whale fishery, which commences here early in July, and continues till September. Storm Bay, Storm Bay Passage, Frederick Henry Bay, and the River Derwent abound with Black Whale, or Right Fish, during these months."

Certain experimental work was carried out by Collins, and in the year 1806 the first "Bay whaling" station was established at Ralph's Bay, River Derwent. This initial system of whaling (apart from the visiting ships from overseas) was continued until the early forties, when, owing probably to the excessive hunting, the Right Whales ceased to visit the coastal bays of Tasmania. Vessels were then built so as to form a Tasmanian whaling fleet for operations on the high seas, the Sperm Whales being the chief species caught. This latter industry was carried on until the eighties.

## OSTEOLOGY.

Unlike the Dolphins, and moderately sized beaked whales, the skeletons of these mighty marine mammals never come into the collections of students and lovers of general natural history. Their great size makes them essentially Museum specimens, and even then, unless proper rooms are available, their skeletons are seldom fully articulated.

The chief feature of the skulls is the wonderful provision for storing and manipulating the baleen, or so-called "whalebone." The jaws being bent outwards to enlarge the capacity of the mouth, and "bone" set slightly at an angle, infolds and underlaps when the mouth is closed.

In the skeleton more remains of the atrophied hind limb than the simple pelvic styles of the *Delphinidae*; indeed it is allowed that traces of the femur and tibia, as well as parts of the pelvis, are present.

A full set of osteological characters collected from a single specimen, showing all bones and moieties in association, would add an interesting chapter to the history of the Whales of our shores.

## PIGMY RIGHT WHALE.

*Neobalæna marginata*, Gray*Neobalæna marginata*, Gray, B.M. Cat. (1866), p. 90.

Southern Seas.

The smallest of the Whalebone whales. Head less than one-quarter the length of body. No grooves on the throat. A small falcate dorsal fin. Baleen white. Vertebral formula—C. 7, D. 17, L. 3, Cd. 16.

Length, up to 20 feet.

References—Beddard, Book of Whales (1900), p. 141.

"This whale is confined to the Southern Seas, and differs from the Right Whale in having but four fingers, instead of five in each paddle. The baleen is white in colour, and there is a small fin on the back. This whale does not attain to a greater length than 20 feet, and is the smallest of the whalebone whales." (Waite, Whales and Dolphins of New Zealand, 1912.)

## OSTEOLOGY.

The osteology of this whale will be fully detailed by Mr. Oliver, of the Dominion Museum, Wellington, at an early date, as five specimens of this creature are in that collection. A specimen of this whale was washed ashore, many years ago, at Kelso Bay, Tamar Heads. Unfortunately, no special interest was taken in the event, and but for the enthusiasm of the late Pastor White no record would ever have been kept of it. Mr. White constructed a raft, and towed the skull to Launceston, and although much weathered by its use as a garden ornament, it is still available for comparison.

As more may be said of this skull in the future, it need be remarked here only that it is fairly symmetrical, some five to six feet in length. The maxillaries are not ankylosed to the intermaxillaries, and the stunted nasals project into the narial cavity. The anterior portion of the skull is curved in vertical section, to form an arc of a circle, and the ear bones are attached to the skull, and not loose, as in the Delphinidæ.

## HUMP-BACK WHALE.

*Megaptera longimana*, Rudolphi.

Cosmopolitan.

Colouration variable. General colour black, the under surfaces of tail and flippers white. Very large pectoral fins ("paddles"), these being a quarter of the length of body, and are notched on the front edge. Dorsal fin very low. Baleen black.

Vertebral formula—C. 7, D. 14, L. 10-11, Cd. 21.

Length, up to 60 feet.

References—Beddard, Book of Whales, 1900, p. 164.

The peculiar humped appearance of the back and the long pectoral fin serve immediately to distinguish this species. This species is of small value in the commercial sense, as the baleen, which is black, is short, and the oil yielded by the blubber of very poor quality.

## OSTEOLOGY.

We have no bones of this whale for osteological purposes. Beddard states that the pelvis retains traces of the femur, and that the scapulae are devoid of processes. The cervicals are apparently free, and the thorax is compounded out of anything up to 14 pairs of ribs.

A few bones of a pectoral limb are all the evidence we have that this whale visits Bass Straits, although it is seemingly a fairly common whale, and no doubt often passes along our coasts.

The wonderful length of the hand of this creature is worth a passing note, as observe:—In a whale of  $49\frac{1}{4}$  feet in total length, the pectoral fin was  $14\frac{1}{2}$  feet long.

Apparently it is an extremely flexible hand, and much cartilage is accordingly found in the wrist, and between the finger bones. The olecranon process is either lightly ossified, or exists largely in a cartilaginous state.

Such an arm would be more than half as long again as that found in an 80 foot Rorqual. As the animal is practically devoid of a dorsal fin, these enormous pectoral limbs are doubtless essential elements in the act of balancing the whale in the water.

## BALÆNOPTERA (Rorquals).

The Rorquals constitute a section of the whalebone whales, but are of small commercial value when compared with the Right Whale. We have not been able personally to investigate much material which is purely Tasmanian as regards this division, and we are indebted to such authorities as Beddard and Waite for much of our information. In previous lists Tasmania has been credited with one Rorqual—"The Sulphur-bottomed Whale." The "Sulphur-bottomed Whale" of the whalers yielded both black oil and baleen, but not of much value. The Sulphur-bottom is often classified as *Balænoptera australis*, but the opinion seems to be gaining ground that "Sulphur-bottom" is merely the Southern form of the Northern, and hence cosmopolitan *Balænoptera musculus*. We have ourselves observed a female *Balænoptera* about 45 feet long, together with a calf about 9 feet long, in D'Entrecasteaux Channel, near Hobart. The under surfaces of this animal were undoubtedly sulphur yellow.

E. R. Waite (Whales and Dolphins of New Zealand, 1912, p. 9) credits New Zealand with three Rorquals, and we do not think we can do better than follow this authority as far as Tasmania is concerned, and for the following reasons:—

1. It is practically certain that the cetacean fauna of New Zealand seas is similar, *sa* regards species, to the seas around Tasmania.
2. The "Finners," "Sulphur Bottoms," and other terms of the early whalers were used for different species of *Balænoptera*.
3. The Blue Whale (*B. sibbaldii*) is not usually shown on Tasmanian lists, but Waite (Rec. S. Aust. Mus., VI., No. 2, 1919) has shown that this occurs both in New Zealand and South Australian seas, and we are therefore convinced that this species visits Tasmanian seas at times.



4. The Sulphur-bottom Whale, from our personal observation, and from the whaling records, is a visitor to the Tasmanian coasts. It has been stated that the Sulphur-bottom does not exceed 30 feet in length, but we have seen one at least well over 40 feet long. The error as regards the length was possibly due to confusing the "Sulphur-bottom" with *B. rostrata*.

We, therefore, list the following Rorquals as being inhabitants of or visitors to the seas of Tasmania:—

Blue Whale (*B. sibbaldii*).

Common Rorqual ("Sulphur-bottom") (*B. musculus*), (*B. australis*).

Pike Whale (*B. rostrata*).

Beddard (Book of Whales, 1900, p. 147) gives the following table for the number of vertebræ of the Rorquals:—

*B. sibbaldii*—C. 7, D. 15, L. 15, Ca. 28.

*B. musculus*—C. 7, D. 11, L. 14-15, Ca. 26.

*B. rostrata*—C. 7, D. 15, L. 12, Ca. 17.

And further states that it is the rule for the whales of this genus to have all the cervical vertebræ free from one another, not ankylosed in the typical whale fashion, but there are exceptions to the rule, and occasionally two or three are partially fused

## BLUE WHALE.

*Balaenoptera sibbaldii*, Gray.

*Balaenoptera sibbaldii*, Gray, P.Z.S. (1847), p. 92.

Cosmopolitan.

The greatest of the whales. Colour black, with white markings, giving a general colour appearance of blue. Pectoral fins large, about one-seventh the length of body. Baleen black.

Vertebral formula—C. 7, D. 15, L. 15, Cd. 28.

Length, probably up to 100 feet.

References—Beddard, Book of Whales (1900), p. 147. Waite, Whales and Dolphins of New Zealand (1912) p. 9. Waite, Rec. S. Aus. Mus., Vol. I., No. 2, p. 157.

The Blue Whale is the greatest of the whales. A specimen stranded in New Zealand in 1908, and described by Waite, measured 87 feet in length, and ten years later the same observer measured one stranded in South Australia, and found it to be practically the same length as the New Zealand specimen. In describing the latter specimen (Rec. S.A. Mus.) E. R. Waite states *inter alia*:—"Very soon after a dead whale is stranded the thin epidermis dries and peels off. I was sufficiently early on the scene at Corvisart Bay to see much of the skin intact, especially where it had been kept moist by the waves or spray. The actual colour of the skin on the back and sides is black, or nearly so, but it is marked with closely set, light coloured, irregularly radiating streaks, which arise from white patches. Some of the streaks anastomose with those from an adjoining centre, and the general effect when seen from a little distance is to produce a bluish tinge, whence the name 'blue whale' is derived."

It was probably one of this species that was referred to in the "Hobart Town Gazette" of May 6th, 1825, wherein it is stated:—"The whale alluded to in our last as having been seen up the river as high as New Norfolk, has since been killed on

the beach at that township above the Punt Ferry. . . . It was not a specimen of the whales usually caught in or near the Derwent, but one of that specimen of fish frequently taken at sea, and known as the 'Fin Back.' It was 90 feet in length, and will produce a considerable quantity of oil." The length, 90 feet, must be taken with the usual reservation, but even a 70ft. whale would cause great excitement if it were to appear off New Norfolk at the present time. It is worth noting that New Norfolk is over 30 miles from the sea.

## OSTEOLOGY.

The beautifully articulated skeleton of this whale, shown at the Canterbury Museum, Christchurch, New Zealand, furnishes students with a splendid example of the osteology of these enormous whales. Glancing at the specimen one notes that the distance occupied by the fore and aft extension of the skull is contained about three and a half times in the total length of the animal. The vertical arc of the skull is low, so that the bird-like appearance of the cranium is sure to impress itself upon the beholder. The scapulæ are wide, with elongated processes, while the short humeri suggests speed, the ulnæ are enlarged proximally by heavy olecranon processes, and four fingers are well developed upon either hand.

Standing near the anterior end of the skeleton a fine view can be obtained of the old *Zygapophyses*, that slowly atrophied as they were supplanted in function by the more recently evolved metapophyses. In the caudal regions no less than seventeen chevron bones appear. In the flesh this animal was 87 feet long, measured between verticals, or 99 feet if carried along the curve of the back—the latter measurement, of course, being absolutely unscientific, but that always adopted by the public!

## COMMON RORQUAL.

*Balænoptera musculus*, Linn. (Sulphur-bottom, *B. australis*.)

Cosmopolitan.

General colour dark slate-grey above, and yellowish white on under surfaces. Dorsal fin low, with straight margins. Baleen black.

Vertebral formula—C. 7, D. 15, L. 14-15. Cd. 26.

Length, up to 70 feet.

References—Beddard, Book of Whales (1900), p. 157. Waite, Whales and Dolphins of New Zealand (1912), p. 9.

We have adopted the cosmopolitan title for the Southern medium sized Rorqual, accepting *B. australis* as a synonym.

The Sulphur-bottom Whale yielded both whalebone and oil, but the quality is rather poor, and in the whaling days these whales often were not considered worth capturing.

## OSTEOLOGY.

A skeleton of this whale is on view at the Dominion Museum, Wellington, New Zealand, not exactly articulated, but serially exhibited as regards vertebræ, ribs, and other parts of the skeleton.

In a general way the osteology of the last-named whale applies to this species. Minute details exist, but they are too technical to warrant inclusion in the present text.

## PIKE WHALE.

*Balaenoptera rostrata*, Gray.

Zool. Err. &amp; Terr. (1846), p. 50.

Size small, snout pointed. General colour greyish black above, under surfaces whitish. Dorsal fin fairly high at commencement of last third of body. Pectoral fin black, with white band, and one-eighth length of body. Balen pale yellow.

Vertebral formula—C. 7, D. 11, L. 12, Cd. 17.

Length, up to 35 feet.

Reference—Beddard, Book of Whales (1900), p. 156.

The Pike Whale is the smallest of the Rorquals, and possibly never exceeds 35 feet in length. Its distinctive features are the rostrate shape of the snout and the white band across the black paddle or pectoral fin. The fact that it possesses only eleven ribs seems another distinctive feature. In discussing the Cetacean Beddard (Book of Whales, p. 147) writes:—"This whale, which appears to have a liking for the society of the larger *Balaenoptera* pursues fishes, and Hunter noted the discovery of dog fishes in the stomach of an individual he dissected. It has been noted, too, that the stomach contains pebbles. This is curious, for in other whales and in sea lions the same observation has been made, possibly in both cases the stones were taken up accidentally whilst in pursuit of fish. One can hardly believe that any idea of ballast entered into the mind of the Cetacean."

## OSTEOLOGY.

We have no recently, or personally collected data regarding the osteology of this whale.

A fine skeleton is on view in the National Museum, Melbourne, and another is articulated and placed on view in the Christchurch Museum.

## ORDER RODENTIA (Rodents).

Terrestrial or aquatic quadrupeds with incisors chisel shaped, and specially adapted for gnawing. No canine teeth.

## Sub-Order SIMPLICIDENTATA.

One pair of upper incisor teeth.

## Family MURIDÆ.

Molars usually three. Tail long. Soles of feet naked.

Genus *HYDROMYS* (Water Rats).

Molars reduced to two pairs, the smallest number among the rodents. Skull without descending zygomatic plate. Toes partially webbed. Dentition—I. 101; M. 2/2.

*Hydromys chrysogaster*.—Water Rat.

Genus *RATTUS*.

Dentition—I. 1/1; M. 3/3.

*Rattus lutreola*.—Dusty-footed Rat.*Rattus velutinus*.—Velvet-furred Rat.Genus *PSEUDOMYS*.

Dentition—I. 1/1; M. 3/3.

*Pseudomys higginsii*.—Long-tailed Mouse.Genus *MASTACOMYS*.

Molars exceptionally broad. Mammæ 4. Dentition—I. 1/1; O.M. 3/3.

*Mastacomys fuscus*.—Broad-toothed Rat.Order *RODENTIA* (Rats, etc.).

The Rodents do not claim many species in the list of the indigenous fauna of Tasmania, but owing to the cosmopolitan migration of Old World forms, and the enormous fecundity of the order, introduced species have spread all over the island. Apart from the introduced forms, which we do not propose to deal with, there are several interesting species. The handsome Golden-bellied Water Rat (*Hydromys*), which grows up to two feet in total length, may be mentioned, and its peculiar dentition; the molar teeth being reduced to two in each series. The Broad-toothed Rat (*Mastacomys*) is another species deserving special mention owing to the reduction and remarkable broadening of the molar teeth. Other indigenous species are the Dusky-footed Rat (*Rattus lutreola*), the Velvet-furred Rat (*R. velutinus*), and the Long-tailed Rat (*Pseudomys higginsii*). Several other forms have been described, but their position is open to criticism. For instance, in 1882 and 1883 Messrs. Higgins and Petterd described in the Papers and Proceedings of the Royal Society of Tasmania no less than eight new species of the order *Rodentia* as follows:—

1. *Mus griseo-cæruleus*.—Blue Rat.
2. *Mus leucopus*.—Short-tailed Rat.
3. *Mus variabilis*.—Swan's Rat.
4. *Mus simsoni*.—Simson's Rat.
5. *Mus pachyurus*.—Thicktailed Rat.
6. *Mus castaneus*.—Chestnut-coloured Rat.
7. *Mus tamarensis*.—Tasmanian Water Rat.
8. *Mus tetragonurus*.—Quadrangular-tailed Rat.

Of these we are of opinion that *Mus griseo-cæuleus* and *M. variabilis* are synonymous with *M. rattus*; and *Mus castaneus* is a synonym of *Rattus velutinus*. Mr. Oldfield Thomas states that the British Museum possesses typical specimens of *M. simsoni* (H. & P., P. & P. Roy. Soc. Tas., 1882, p. 175), and that these are *M. musculus*. Higgins and Petterd merely relied upon slight external variations upon which to found species. Again, their type specimens were not preserved. Of the eight species listed above we only propose, until provided with additional evidence, to allow *Mus leucopus*. The designation *Mus leucopus*, however, has had to give way to *Pseudomys higginsii*. The vernacular designation has also been changed, as Messrs. Higgins and Petterd's measurements do not agree, and the name Long-tailed Rat is more appropriate than the Short-tail. *Mus tamarensis*

may also be a variation of *Mus rattus*, but at present we have no exact data respecting this animal, and accordingly we cannot pass judgment upon it, especially as the variations in size (claimed for specimens of this species) would bring it up closely to the dimensions of the Black Rat. Upon the surface it looks as though the type of the species was an immature animal, but as no types were kept, it is impossible to check this.

## THE WATER RAT.

*Hydromys chrysogaster*, Geoffrey.

*Hydromys chrysogaster*, Geoffrey, Ann. Mus. Hist. Nat. (1805), p. 90.

Range—Tasmania and Eastern Australia.

General form long and slender. Muzzle long and pointed. Molars, two in each jaw. Fur thick. The head and upper surface black. Under surface orange, in some specimens the colouration is remarkably rich. Toes partially webbed.

Dimensions—Head and body, 300 mm. Tail, 280 mm.

Reference—Coul. Mammals of Australia, Vol. III., pl. 24.

This species is a true water rat, and has developed partial webbing to the toes. The remarkable reduction of the molar teeth to two in each jaw is a unique characteristic of this rat. It is mainly a nocturnal animal, but also feeds in the twilight. Owing to this habit, and the fact that it is a shy animal, specimens are not very often observed, but the species is common at certain places on the sea shore and along rivers and creeks. It follows these well inland, and we have specimens that have been secured many miles from the coast. It swims freely, and feeds chiefly on molluscs, crustaceans, fish, and a certain amount of vegetable matter. Its swimming powers are assisted by the webbing to the feet and hands—the latter not having the webbing developed to the extent of the former.

## OSTEOLOGY.

The skull of this animal shows nothing of the palatal fenestration found in the English Water Rat.

The skull of an average adult specimen, taken at random, supplied the following notes;—

Basal length .. ..	41 mm.
Greatest width .. ..	24 mm.
Tooth line .. ..	9 mm. (The mandibular being the same.)
Length of nasals .. ..	16 mm.
Anterior width of nasals ..	6 mm.
Posterior width .. ..	3.5 mm.

The parietals are large, and evenly rounded in the transverse direction; the occipital condyles widely separated, the greatest outside width (across them) being equal to 14 mm. Zygomatic arch slender and simple, bullæ well developed. The pre-alveolar extent of the mandibular incisor is 14 mm.

## DUSKY-FOOTED RAT.

*Rattus lutreola*, Gray.*Mus lutreola*, Gray, Grey's Travels in N.W. and W. Australia, Appendix page 409.

Range—Tasmania, Southern and Eastern Australia.

General form stout. Fur long and soft. Upper surface black, grizzled grey. Under surface greyish. Feet brown, tail black. Upper incisors orange.

Dimensions—Head and body, 175 mm. Tail, 110 mm.

References—Gray, Grey's Travels in N.W. Australia, Appendix page 409. Gould, Mammals of Australia, Volume III., p. 11.

The Dusky-footed Rat of Tasmania and South-Eastern Australia is usually referred to as *R. fuscipes*, but Mr. Oldfield Thomas has pointed out to us that *R. fuscipes* should be retained for the West Australian form, and that the Tasmanian Rat is *Rattus lutreola*.

This rat is often referred to as the Water Rat owing to the fact that it can swim with great ease, and is found usually in the vicinity of water.

## VELVET-FURRED RAT.

*Rattus velutinus*, Thomas.*Mus velutinus*, Thomas, A.M.N.H. (1882), IX., p. 415.

Range—Tasmania.

General colour grey to chestnut, the ears, feet and tail often having a brown colouration, but this does not apply in all cases.

Dimensions—Type specimen of *Rattus castaneus*, male animal, Higgins and Petterd:—

Head and body	..	171 mm.
Hind foot and nails		110 mm.
Ear	..	22 mm.

Male *Rattus velutinus* (in our collection):—

Head and body	..	171 mm.
Tail	..	127 mm. (Females 67 to 98 mm.)
Hind foot	..	34 mm.
Ear	..	22 mm. (Immature females 17 mm.)

References—Thomas, A.M.N.H. (1882), IX., p. 415. Higgins and Petterd, Pap. & Proc. Roy. Soc. Tas. (1883), p. 83.

We are of the opinion that the type specimen of *Mus castaneus* described by Higgins and Petterd (Pap. & Proc. Roy. Soc. Tas., 1883) was really a male of this animal. The name *Mus velutinus* of Oldfield Thomas dates from 1882, whilst that of *Mus castaneus* did not appear until the following year. The appended table of measurements is interesting in this connection. We must, however, point out that considerable systematic work is still needed, and until this has been carried out upon a recently collected series of specimens, conclusions must be regarded as tentative rather than final. We hope at a later date to pay more attention to this matter, and in the meanwhile accurately localised specimens are a desideratum.



After Gould

Dusky-footed Rat



Skeleton of Nototherium.

Tasmanian Museum



It is strange that this shapely, chestnut coloured rat escaped detailed observation until the eighties of last century, for the colouration and softness of the fur should have attracted attention earlier.

Fleas carried by this species include *Stephanocircus simsoni*.

### OSTEOLOGY.

The student will notice that although the skull, as a whole, falls considerably short of that of an adult "Brown Rat" in point of size, it approaches it very closely in the manner in which the anterior plate of the zygonia bounds the anteorbital foramen, and in the general make up of the face arch. The transversely oblong interparietal of the brown rat is exactly moon shaped in this bush rat. Where a rat's skull would measure 45 mm. in basal length, that of *Rattus velutinus* would not exceed 35 mm.

The robust teeth of the Bush Rat no doubt relate to its rougher conditions of life. In dealing with skull dimensions, Messrs. Petterd and Higgins say:—

Length of skull .. ..	40 mm.	(This is total, and not basal.)
Width of skull .. ..	27 mm.	
Length of Nasal bones	22 mm.	
Length of Palatine bones	22 mm.	
Width of interorbital space .. ..	5 mm.	

A skull of *Rattus velutinus* gives:—

Total length .. ..	40 mm.
Width .. ..	24 mm.
Length of Nasals .. ..	19 mm.
Length of Palatine bones	19 mm.

Messrs. Petterd and Higgins' notes upon the osteology of the lower jaws apply equally well to the mandible of the animal whose other skull measurements have just been passed in review.

It is unfortunate that the local naturalists, who had probably known this animal for years, did not describe it at an earlier date.

### LONG-TAILED RAT.

*Pseudomys higginsi*.

*Mus leucopus*, Higgins & Petterd, P. & P. Roy. Soc. Tas. (1882), p. 174.

Range—Tasmania.

Extreme tip of nose white. Whiskers black and white, some over two inches long. Fur long, thick and soft. Upper brown, tinged blue. Under greyish white. Feet white. Upper incisors dark orange, lower incisors light orange.

Dimensions—Head and body, 160 mm. Tail, 175 mm.

References—Higgins & Petterd, P. & P. Roy. Soc. Tas. (1882), p. 174. Higgins & Petterd, P. & P. Roy. Soc. Tas. (1883), p. 186. Lord, P. & P. Roy. Soc. Tas. (1922), p. 55.

In the list of measurements given with the description of the type, Messrs. Higgins and Petterd give the following:—

Length from tip of nose to root of tail .. ..	5 $\frac{3}{4}$ inches
Length of tail .. .. .	3 $\frac{3}{4}$ inches

In a later publication (P. & P. Roy. Soc. Tas., 1883, p. 186) Messrs. Higgins and Petterd state that the measurements of the type specimen were 3 $\frac{3}{4}$  inches for both the body and the tail, so it is difficult to know exactly what the type (which was not preserved) did measure, more especially as in the type description they refer to the tail as being long.

In this later publication reference is made to the fact that further specimens of the species had been secured, but the measurements of same were:—

From tip of nose to root of tail .. .. .	5 $\frac{1}{2}$ inches
Length of tail .. .. .	6 $\frac{1}{2}$ inches

We have been fortunate in securing a series of specimens of this species. Apart from the question of size, they generally agree with the type description. As regards size, the length from tip of nose to root of tail averages 5 $\frac{1}{2}$  inches, and the tail 6 $\frac{1}{2}$  inches.

Specimens from our series have been forwarded to the British Museum and examined by Mr. Oldfield Thomas, who states that they agree with the specimens forwarded to the institution by Mr. Petterd under the title of *Mus leucopus*.

In view of the discrepancies which have occurred we give the following description of a recent specimen:—

Extreme tip of nose white. Whiskers black and white, some over 2 inches long. Fur long, thick and soft. The general colour of upper part dark brown, tinged blue, the under fur being slate blue. Darkest colouration on back merging into pale brown on sides, and into greyish white on under surface. Upper portion of tail similar to upper part of body; the whole of the under portion of tail white. Hairs on tail, especially at end, long. Both feet white. Upper incisors dark orange, lower light orange.

Ears rather large. Tail longer than head and body. Claw of fifth hind toe just reaches base of fourth toe. Five sole pads on fore feet, six on hind feet.

Lake Fenton (3500 feet), Mount Field, Tasmania, March, 1922.

Head and body .. ..	160 mm.
Tail .. .. .	175 mm.
Hind foot .. .. .	35 mm.
Ear conch .. .. .	27 mm.
Muzzle to ear .. .. .	40 mm.

Upon the strength of the type description the vernacular designation of Short-tailed Mouse was given to this species, but it is very apparent that such a designation is not at all appropriate, and that the vernacular name of Long-tailed Rat appears to be the most suitable. The most prominent characteristics are the white tip to the nose and the white feet, but such a title as the White-footed Rat would cause confusion, in the vernacular, with the white-footed pouched mouse (*Swinthopsis leucopus*).

The species is well distributed over the island, and specimens have been obtained from many localities. Most of our own observations concerning the general habits of this species have been made at Lake Fenton (3500 feet, on Mount Field), where this rat is fairly common.

The upper incisors are dark orange colour, the lower ones being much lighter.

Fleas noted on this species include *Macropsylla hercules*.

## OSTEOLOGY.

In general construction the skull of this rat conforms more to the type of black rat rather than that of its brown congener, the cranium especially having the characteristically smooth parietal regions. Skulls of this species manifest a greater forward development of the nasals than obtains in the black rat's skull, and the zygomatic arch is centrally more slender, in spite of a strongly built maxillary plate.

Dimensions:—

Total length	..	..	..	35 mm.
Basal length	..	..	..	30 mm.
Greatest width	..	..	..	17 mm.
Construction width	..	..	..	6 mm.
Length of nasals	..	..	..	13 mm.

The bullæ are well developed, and closely inset to the skull. The considerable incurve of the incisor teeth can be deduced from the above set of measurements.

## BROAD-TOOTHED RAT.

*Mastocomys fuscus*, Thomas.

*Mastacomys fuscus*, Thomas, A.M.N.H., 414, No. 54, 5th Ser. (1882).

Range—Tasmania.

General colour brown. Fur very long and soft. Ears large. Tail shorter than head and body. Sole pads, five on fore feet and six on hind feet. Mammæ, four. The molars are remarkably broad.

Dimensions—Head and body, 145 mm. Tail, 95 mm.

Reference—Thomas, A.M.N.H. (1882), p. 414.

The Broad-toothed Rat is notable for the remarkable broadening of the molars. As far as it known at present this rat is confined to Tasmania, but fossil remains of a similar form have been found in the Wellington Valley Caves of New South Wales.

## ORDER CARNIVORA.

Terrestrial or aquatic flesh eating quadrupeds with sharp cutting and tearing teeth.

Sub-Order PINNAPEDA (Seals, Etc.).

Mammals adapted for aquatic life. Limbs evolved into swimming organs.  
Family PHOCIDÆ (Hair Seals).

Without external ears. Hind limbs in shape of tail, and unfitted for progression on land.

Genus OGMORHINUS (Sea Leopards).

Dentition—I. 2/2, C. 1/1, M. 5/5.

*Ogmorhinus leptonyx*.—Sea Leopard.

Family OTARIIDÆ (Fur Seals).

Ears small. Hind limbs capable of being turned forward for progression on land.

Genus EUTARIA (Eared Seals).

*Eutaria cinerea*.—Sea Bear or Fur Seal.

Order CARNIVORA (Seals, Etc.).

The order *Carnivora*, which consists of non-marsupial, terrestrial, or aquatic animals with sharp cutting teeth suitable for flesh eating, is not a large one as far as the number of representative species in Tasmania is concerned. In fact the sole representatives are aquatic forms of semi-cosmopolitan type.

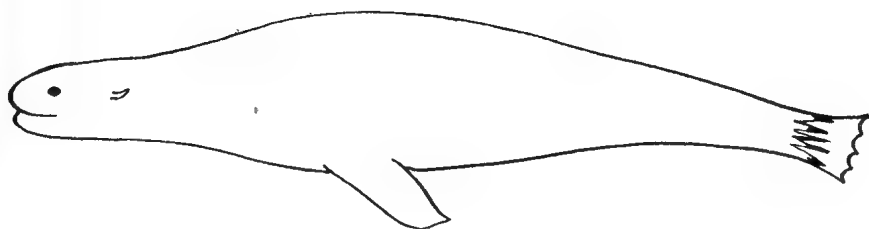
## PINNIPEDA.

The sub-order *Pinnipeda* includes the aquatic forms, such as seals, etc., in which the limbs have become modified in accordance with their habits of life. The legs have become mere flippers, and the toes are united by strongwebs. Two families are represented, the *Otaridæ*, which have small external ears, and the *Phocidæ*, which have lost all trace of an external ear conch.

OTARIIDÆ (Eared Seals).

The Eared Seals may be identified immediately owing to the presence of a small external ear conch and the independence of the hind limbs, which are not merged into a tail-like appendage, as in the true seals but are adapted for terrestrial locomotion.

## SOUTHERN FUR SEAL

*Eutaria cinerea*, Peron.

This species inhabits the Southern seas and shores of adjacent islands.

Colour variable, some specimens being much darker than others. The general colour being from dark brown to grey above, and chestnut beneath. The young and immature forms are almost black above, and rusty grey below. When seen in the water or on the rocks just after emerging from the sea the colouration of the darker individuals appear in many cases a shiny black.

Small external ears plainly visible. The hind limbs capable of being turned forwards to permit the animal to be active as regards terrestrial locomotion. The fore limbs in posterior position giving a very lengthened appearance to the neck.

Average measurements:—Males, 7ft. 6in.; females, 5ft. 6in.

The measurements show very considerable variation, and some of the old bulls are of much larger dimensions than the average.

Reference—McCoy, Prodromus Zoo., Vic., Vol. I., pls. 31, 71.

Both the scientific and vernacular nomenclature, together with the taxonomic descriptions of the Australian Seals is open to very considerable research. In the past the loose use of the terms "Fur Seal," "Hair Seal," "Sea Bear," etc., has led to much confusion, and the scientific classification and taxonomic descriptions have suffered likewise. There is difficulty in securing a long series of specimens to allow for detailed investigation, and many writers appear to have followed previous descriptions without making any original investigations. We have endeavoured to secure as much information and as many specimens as possible in order to allow us to set at rest certain points which continually are giving rise to controversy. Whilst by no means satisfied that we have as yet examined a long enough series of specimens, and bearing well in mind the assurance of fishermen that there are several different species to be met with in the islands of Bass Straits, yet as far as we have carried our investigations at present colour, sex, and age variations will account for the differences in all the specimens examined by us. Our investigations, therefore,

serve to support the views put forward by McCoy (Prod. Zoo. Vic., Vol. I., pl. 71, p. 10), that there is but one species of fur seal now inhabiting these waters, namely, the Australian Sea Bear, or Fur Seal (*Eutaria cinerea*).

Considering the part that the sealing industry played in the early history of the State, it might be as well to recall a little in regard to its history. Had a policy of protective economy been instituted instead of ruthless destruction the industry might now be a permanent source of revenue to the State. As it is the industry was destroyed in the interests of a few.

We should profit by this object lesson, and not allow the rich harvest of the fur and skin trade in connection with our marsupial fauna to come to the same end as the sealing industry.

There were doubtless many vessels, particularly American, which visited our coasts in the early days of the sealing and whaling industry, concerning which we have no records. Many of the early explorers referred to the large numbers of seals—Peron records the "innumerable legions" on the shores of Maria Island, for instance. The first real record we have as regards the industry from a Tasmanian standpoint is in 1798. In February of that year the schooner *Francis* was sent from Port Jackson to salvage the wreckage of a vessel on Preservation Island. It was due to this voyage that a great number of seals were reported, with the result that when Bass and Flinders left Port Jackson in the *Norfolk* they were accompanied by a small brig, the *Nautilus*. This latter vessel returned to Sydney shortly afterwards with no less than 9000 seal skins and several tuns of oil.

The trade developed rapidly, apart from the sealing vessels there were numerous parties stationed on the various islands. In many cases a few men would secure a boat, carry off a number of unfortunate aboriginal women, and form a sealing station on some of the out-of-the-way islands. James Kelly has left us a description of these times that, from their historical interest, may well bear repetition here. He states, *inter alia*:—"The customs of the sealers in the Straits was that every man should have from two to five of the native women for their own use and benefit. To select any of them they thought proper to cohabit with as their wives. In fact, a large number of children have been produced between these people. . . . and a fine, active race of people they are, both for hunting kangaroo and catching seals."

As regards the method of capturing the seals by the aborigines, etc., Kelly states:—"We gave the women each a club that we had used to kill seals with. They went to the water's edge, and wet themselves all over their head and body as, they said, to prevent the seals from smelling them as they worked along the rocks. They were very cautious not to go to windward of them, as they said 'a seal would sooner believe his nose than his eyes when a man or woman came near him.' The six women walked into the water two and two, and swam to three rocks about fifty yards from the shore. Each rock had about 9 or 10 seals on it, and they were all lying apparently asleep. Two women went to each rock with their clubs in hand. Each of them crept slowly close up to their seal, and lay down with their club alongside them. Some of the seals rose their heads up to look at their new visitors, and smell them, scratched themselves, and lay down again. This was done with their fin or flipper.

"The women went through nearly the same motion as the seal did by holding up the left elbow a little, and scratching themselves with their left hands, keeping the club firm in the right hand ready for the attack. . . . All of a sudden the women arose up on their seats, their clubs at arm's length. Each struck a seal on the nose, which killed him, and in an instant they all jumped up, as if by magic, and killed one more seal each."

The above gives an idea of the early sealing days, and the industry was carried on until the fur seals were almost exterminated, except in a few localities.

Of recent years, owing to protective measures, their numbers have tended to increase, and often they may be seen on the islands in the Straits, and certain localities on the East Coast, such as the Isle du Phoques and the Hippolytes.

Professional fishermen are keen on the destruction of the seals, but there is much in connection with the balance of Nature that we have yet to learn. For instance, a century and a quarter ago the coasts of Tasmania swarmed with "innumerable legions of seals," and yet, from all accounts, edible fish were far more plentiful than they are to-day, in spite of the fact that the "innumerable legions" have been reduced to a few hundreds.

Senior Constable Mansfield, of Flinders Island, who has had considerable experience with regard to the present conditions of the seals, etc., in Bass Straits, reports that the seals are fairly plentiful on the rocks and reefs adjacent to Cape Barren Island. The young male seals are known as "young wigs," the old males as "wigs," and all female seals at "clap-matches."

In connection with the foregoing the following remarks are of interest:—

### EXTRACT FROM A PRELIMINARY REPORT ON THE FISHERIES OF NEW ZEALAND, 1914.

(By Professor Prince, Commissioner of Fisheries for Canada.)

#### FUR SEALS AND OTHER SEALS.

"While making my cruise on the 'Hinemoa' I had several opportunities of seeing the last remnants of the great seal herds which once abounded on a number of rookeries in the southern waters of the Dominion. It is stated that between 1816 and 1826 one hundred sealers were permanently settled in New Zealand; and the annual takes of valuable fur seals were enormous, from one southern island alone during 1814 and 1815 no less than four hundred thousand skins being obtained and taken to London. The sealing vessel 'Pegasus' took to London one hundred thousand of these, but they were so badly handled that they heated during the voyage, and were ruined, so that they had to be dug out of the hold and sold as manure—a frightful waste of valuable skins. The methods of killing were of a most cruel, indiscriminate, and wasteful character, and the result is that the New Zealand seal rookeries, which should be yielding enormous annual returns, are practically of no value or importance so far as their production is concerned. The establishment of sealing prohibitions in recent years has not had the effect of restoring the numbers of this valuable animal; but this is explained by the fact that no patrol is maintained, and the destruction of seals goes on undetected, thereby defeating the object of the prohibitions. A few score seals are all that remain on some of the rocky ledges which I visited, and which once abounded with the fur seal. The sealers in former days carried on their pursuit like madmen, using no discretion, and simply slaughtering right and left, old and young, males and females. The numbers killed were sometimes so great that a great many passed into a state of putrefaction without either being skinned or utilised.

"No intelligent person can doubt that this reckless destruction carried on without any supervision or control by sealing crews from all parts of the world, but chiefly from Britain and the United States, has been a gear mistake. The example of the United States shows what a valuable asset fur seal rookeries are if properly protected and supervised. It is well-known that the fur seal industry of Alaska has yielded to the United States Government an enormous revenue, and, with the fishery returns, has paid many times over the price which secured from Russia this Arctic territory.

"New Zealand can still restore her fur seal industry by the following measures:—(1) A prohibition for a number of years of all seal killing and handling of seal skins; (2) a regular patrol around the shores and islands frequented by seals; (3) the prohibition of all sealing operations excepting under a licence issued by the Dominion Government.

"There is no force in the argument which has been urged that fur seals are reducing the supply of fish in the neighbourhood of the rookeries. Fur seals feed largely on the inferior species, which are of no marketable value; and, as is well-known, in Behring Sea the presence of enormous herds of fur seals has no effect on the great abundance of the valuable fish required for commercial purposes.

"While thus strongly recommending the protection of the fur seal rookeries, and the taking of steps for restoring them to plentitude, I make no reference to the various species of hair seal, such as the sea leopard and harbour seal. The harm done by these seals, I am of opinion, is exaggerated; and scientific evidence does not support the contention that schools of hair seals seriously affect the supply of fish in the sea.

"It might be possible to utilise such a vessel as the training ship 'Amokura' in the work of patrolling the fur seal areas; and were the penalty of violation made very heavy, and include confiscation of vessel and gear, the effect would without doubt be completely successful."

## OSTEOLOGY.

In the Sea Bear the globose cranium of the sea leopard has no counterpart. The parietals in mature skulls are ankylosed to the squamosal elements, and rise upwards to form a transverse occipital crest, thus converting the nuchal attachment areas of the supra occipital into a large fossa. Owing to the reduction of the cranial capacity the face arches appear to stand away much farther than obtains in the skulls of sea leopards, although their total widths are much the same. The strong occipital and parietal crests will quickly serve to separate skulls of the sea bear from those of the sea leopard. From the anteorbital foramen to the tips of the premaxilla, the sea bear will measure some 75 mm., as against 100 mm. for a sea leopard's skull. Moreover, the sea bear's skull is compressed at the root of either zygoma, but markedly expanded in the sea leopard's skull.

Viewed from below, the palate of the sea bear is long and narrow, never exceeding 40 mm. between the teeth, as compared with 65 mm. for the sea leopard. In the sea bear, the glenoid cavities have actual articular surfaces of 55 mm. in length, forming grooves of even width through—while those of the sea leopard are much wider, and in articular surfaces only extend transversely for 40 mm.

In the sea bear the otocrane is heavy, rough, and massive, but the bullæ are less expanded than obtains in the comparative skull. The occiput throws downwards a powerful compound process, apparently composed of post tympanic, mastoid, and par-occipital moieties. The total length of an eight feet animal's skull is 280 mm.—or eleven inches, as compared with thirteen inches for the other skull. The dental formula is as follows:—

	2.2		1.1		6.6
Incisors	—	Canines	—	Molars	—
	2.2		1.1		6.6



## AUSTRALIAN SEA LION.

*Zalophus lobatus*, Gray.

South-Western Australian seas.

Colour variable, according to sex and age characteristics. General colour dark brown, with fawn coloured patch on back of head and neck. In the young the under fur is the lightest.

Dimensions—Males, up to 10 feet; females smaller.

Reference—Gould, Mammals of Australia, Vol. III., pl. 49.

There is some evidence to the effect that this seal is to be seen in Bass Straits occasionally, but we have no personal observations to support this view.

## PHOCIDÆ.

The family *Phocidæ* embraces the true seals. The animals have become more adapted for an aquatic life than the eared seals. All trace of an external ear conch has been lost, and the hind limbs have merged into two forceful vertical swimming paddles, which are almost useless for terrestrial locomotion.

Tasmania is usually credited with but one representative of the family, namely, the Sea Leopard (*Ogmorhinus leptonyx*), but in view of the fact that a second Antarctic species, the crab-eating seal (*Lobodon carcinophaga*) has been recorded on at least two occasions from the Victorian coast there can be no doubt that this second species is also an occasional visitor to the shores of Tasmania.

## SEA LEOPARD.

*Ogmorhinus leptonyx*, Blainville.

## Sea Leopard (Continued).

This species inhabits the Antarctic Ocean, and stragglers reach as far North as Lord Howe Island.

General colour grey, the upper portion of body being marked with whitish spots. The under surfaces are paler.

Average measurements—From seven to eight feet. Larger individuals, even up to twelve feet, are met with.

Reference—Gould, Mammals of Australia, Vol. III., pl. 1.

The true home of the Sea Leopard is the ice regions of the Antarctic, but it is a fairly frequent visitor to the shores of Tasmania, and occasionally stragglers reach the Australian coasts.

When John Gould, the famous Naturalist, visited Tasmania he landed at Port Arthur, and found one of these animals on the beach. After a struggle his men were able to secure it for his collection. These animals are often to be seen on certain of the beaches of the Southern Coast, such as Adventure Bay. Occasionally they come far up the river, and specimens have been secured above Hobart. One specimen, now in the Tasmanian Museum (which measures 7ft. 9in.) clambered up the sloping boat ways at the Hobart Wharf, and was found in the small hours of the morning by a policeman, who mistook the sea leopard for an incapacitated citizen. The animal's vicious protest, when an attempt at an arrest was made, gave the arm of the law a severe shock to his nerves.

We have often had the opportunity of examining specimens of this species on the Tasmanian beaches. Most of them have been considerably scarred, and bear evidence of combats. Perhaps the usual straggler to these regions represents individuals which have been defeated in the fierce courtship fights amid Antarctic ice. Owing to this species being unsuited for terrestrial progression, it is fairly easily overtaken when it commences to make its way to the water. It is very powerful, however, and it takes three or four men to hold it when it commences to struggle for freedom. Care must also be exercised, for it has a habit of remaining quite still for a few moments, and then suddenly heaving up its body, turning its head, and making a vicious snap at anyone interfering with it. An examination of its sharp cutting teeth shows that they are good weapons to avoid.

The Sea Leopard lives upon penguins and fish, mixed with a little vegetable matter in the shape of certain seaweeds.

## OSTEOLOGY.

Unless specially obtained for Museum purposes, the skulls of these animals are sure to be mutilated, owing to the common practice of clubbing the creatures to death.

The cranial regions of the skull are globose, the supra occipital meeting the parietals at the vertex, as in the land carnivora, and not expanding, as in the cetacea. The parietals really are walls, and meet to form the calvarial area. The frontals are narrow and bridge-like, linking the powerful maxillaries with the parietal and squamosal elements. The premaxillaries throw up processes that encircle the nasal aperture, the latter being terminal. The nasals project into the nasal cavity, and partly roof it over, and send back a dart to half the extent of the frontal constriction. The lacrymals are fused to the maxillaries, but the malars are still seen as strongly individual bones in the zygomatic arches. The premaxillaries from the first 30 mm. of the palate, the next 75 mm. being contributed by the maxillaries, the palatines add another 32 mm. to the notch, or 63 mm. if their junction with the pterygoid is made their termination.

The otocrane is massive, making an approach in this respect to the cetacean habit, and the glenoid cavities are very deeply impressed. Owing to the compression of the frontals, and the outward sweep of the zygomatic arches, the fosa temporalis forms an extensive cavity, upon either side of the skull, measuring 130 mm. in length, and 70 mm. in width, with a height of 75 mm.

A fully developed skull will measure some 313 mm. (approximately 13 inches) in length, and 180 mm. (approximately 7 inches) in width. Many interesting characters exist in these skulls that cannot be recorded here. The dental formula is as follows:—

	2.2		1.1		3.3		2.2	
Incisors	—	Canines	—	Premolars	—	Molars	=	32
	2.2		1.1		3.3		2.2	

#### ORDER CHIROPTERA (Bats).

Mammals adapted for flight.

Sub-Order MICROCHIROPTERA (Insect Eating Bats).

Molar teeth tubercular. Insectivorous.

Family VESPERTILIONIDÆ (Typical Bats).

Ears large or medium. Nasal apertures simple. Tail long.

Genus NYCTOPHILUS.

Muzzle narrow. Ears large, oval, and connected. Eyes large. Tail projecting slightly from membrane. Dentition I. 2/2 or 2 3, C. 1/1, P. 1 2, M. 3/3.

*Nyctophilus timoriensis*.—Aust. Long-eared Bat.

Genus VERSPERUGO.

Muzzle broad and obtuse. Ears short, broad and triangular. Dentition I. 2/3, C. 1/1, P. 1/1 or 2/2, M. 3/3.

*Vesperugo pumilis*.—Little Bat.

*Vesperugo krefftii*.—Krefft's Bat.

Genus CHALINOLOBUS.

Muzzle broad. Ears short and broad. Dentition I. 2/3, C. 1/1, P. 2/2 or 1/1, M. 3/3.

*Chalinolobus morio*.—Chocolate Bat.

*Chalinolobus gouldi*.—Gould's Bat.

Family EMBALIONURIDÆ.

Tail slender, terminating in interfemoral membrane.

Genus NYCTONOMUS.

Ears rounded, and united by a band in front. Dentition—I. 1/3 or 1/2, C. 1/1, P. 2/2, M. 3/3.

*Nyctonomus plicatus*.—Plicated Bat.

## ORDER CHIROPTERA (Bats).

The order *Chiroptera* embraces the cosmopolitan group of animals adapted for flight—the Bats. As far as Tasmania is concerned their representation is limited to the members of the sub-order *Microchiroptera*, or insect eating Bats. Two families and six species occur in the Tasmanian faunal list as follows:—

*Nyctophilus timoriensis* —Australian Long-eared Bat.

*Vesperugo pumilis*.—Little Bat.

*Vesperugo krefftii*.—Krefft's Bat.

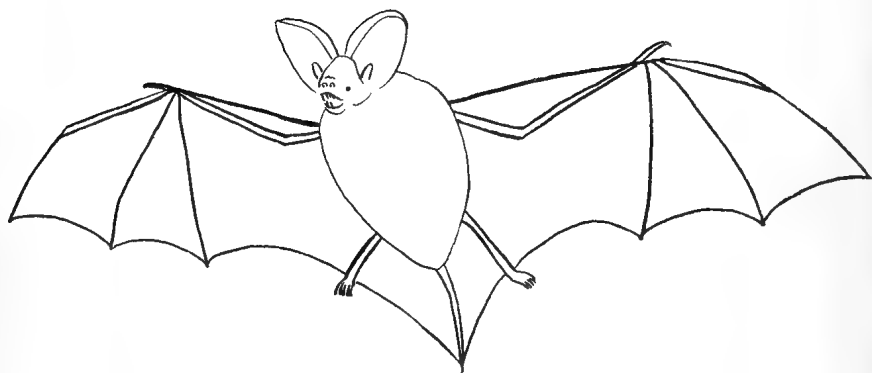
*Chalinolobus morio*.—Chocolate Bat.

*Chalinolobus gouldi*.—Gould's Bat.

*Nyctinomus plicatus*.—Plicated Bat.

## AUSTRALIAN LONG-EARED BAT.

*Nyctophilus timoriensis*, Geoffrey.



*Vespertilio timoriensis*, Geoffrey, Ann. du Mus. VIII., p. 200 (1806).

This species inhabits Tasmania, Australia, and the neighbouring islands.

Muzzle narrow. Ears large, oval, larger than head, and connected by a well defined band over the forehead. Wings from the base of the toes. Tail almost contained within the interfemoral membrane. Fur thick, the colour being variable. Usually olive brown above and pale brown to whitish below. Throat the palest portion, often being white.

Measurements variable. The following may be accepted as the average:—

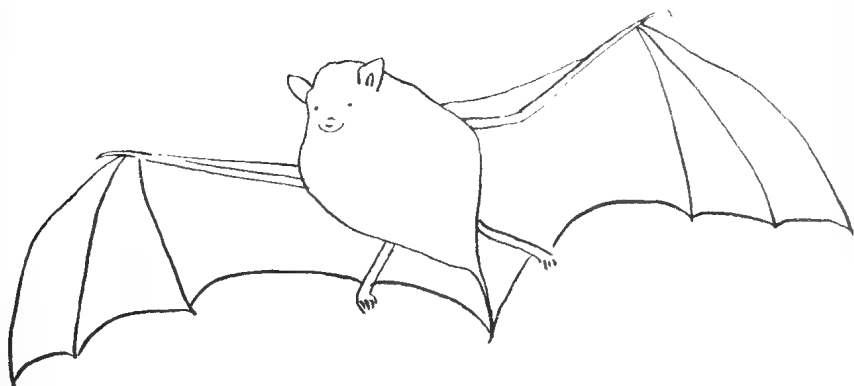
Head and body	..	..	50 mm.
Fore arm and tail	..	..	45 mm.

References—Dobson, B M. Cat. Chiroptera p. 172 (1878). Gould, Mammals of Australia, Vol. III., pls. 36, 37, 38, 39.

This species was at one time split into four and *Nyctophilus unicolor* (Tomes, P.Z.S., pt. XXVI., p. 33) figured by Gould (pl. 39, Vol. III.) was regarded as the Tasmanian form. It is now generally agreed to class all the Australian forms under the one specific head.

### LITTLE BAT.

*Vesperugo pumilis*. Gray.



*Scotophilus pumilis*, Gray App. Grey Exp. Aust., p. 406 (1841).

This species inhabits Tasmania and Australia.

Muzzle broad. Ears broad, triangular and shorter than head not connected by any band. Wings from the base of the toes. Tail shorter than head and body. Fur above greyish brown to black. Under surface paler. Wing membranes purplish brown.

Average measurements:—

Head and body	..	..	40 mm.
Tail	..	..	35 mm.
Fore arm	..	..	30 mm.

References—Dobson B.M. Cat. Chiroptera, p. 203 (1878). Gould, Mammals of Australia, Vol. III., pl. 46.

This species is the smallest of the Tasmanian Bats. The genus *Vesperugo*, unlike most bats, produces two young at a time.

## KREFFT'S BAT.

*Versperugo krefftii*, Peters.*Versperugo krefftii*, Peters, M.B. Akab. Berl., p. 404 (1869).

This species inhabits Tasmania and Eastern Australia.

Muzzle broad. Ears triangular, and shorter than head. No connecting band. Wings from base of toes or metatarsus. The extreme tip of tail projecting from the interfemoral membrane. Fur reddish brown, the under surfaces being paler. Wing membranes purplish brown.

Average measurements:—

Head and body	..	..	55 mm.
Tail	..	..	50 mm.
Fore arm	..	..	45 mm.

Reference—Dobson, B.M. Cat. *Chiroptera*, p. 232 (1878). Gould, Mammals of Australia, Vol. III., pl. 48.

This species was listed by Gray (p. 194) in List of Mammals in the British Museum in 1843 as *Noctulinia tasmanensis*, but was not described. Gould's illustration (Vol. III., pl. 48) is designated *Vespertilio tasmanensis*.

## CHOCOLATE BAT.

*Chalinolobus morio*, Gray.*Scotophilus morio*, Gray, Grey Exp. Aust., Vol. II., p. 405 (1841).

This species inhabits Tasmania, Eastern and South Australia, and New Zealand.

Muzzle broad and short. Ears short no connecting band. Wings from the base of the toes. Tail contained entirely within the interfemoral membrane. The fur is from very dark brown to black, being usually darker towards the anterior portion of the body. Under surfaces paler.

Average measurements:—

Head and body	..	..	45 mm.
Tail	..	..	42 mm.
Fore arm	..	..	37 mm.

References—Dobson, B.M. Catalogue *Chiroptera*. p. 248 (1878). Gould, Mammals of Australia, Vol. III., pl. 41.

The Chocolate or Small-toothed Bat is not as common as several of the other species. One reason why it is not so often obtained is because it flies at a higher elevation around the topmost branches of the trees instead of flying low over the surface of lagoons, etc.

## GOULD'S BAT.

*Chalinolobus gouldi*, Gray.*Scotophilus gouldii*, Gray, App. Grey's Two Exp. Aust., p. 405 (1841).

This species inhabits Tasmania Eastern and Southern Australia.

Muzzle broad and obtuse. Ears shorter than *C. morio*, entirely separate. Wings from the base of the toes. Tail, except for the extreme tip, contained within the interfemoral membrane. Colour of fur variable, above brown-blackish towards anterior. Under surfaces paler brown to greyish. In the more prominently marked specimens the anterior upper portion of the body is almost black, while the posterior is brown. Wing membranes purplish brown.

Average measurements:—

Head and body	..	..	65 mm.
Tail	..	..	57 mm.
Fore arm	..	..	45 mm.

References—Dobson, B.M. Catalogue *Chiroptera*, p. 250. Gould, Mammals of Australia, Vol. III., pl. 40.

Gould's Bat, as a rule, frequents timbered country or areas where the scrub is fairly thick. The darker colouration of the anterior portion of the body serves as a specific identification.

## PLICATED BAT.

*Nyctonomus plicatus*, Buchanan-Hamilton (1800).*Vespertilio plicatus*, Buchanan-Hamilton, Trans. Linn. Soc., p. 261 (1800).

This species inhabits Tasmania, Australia, and through the islands to India.

Muzzle truncated, and projecting beyond the lower jaw. Ears large, and united by a low band in front. Wings from the lower end of the tibia, the tail being stout, and produced beyond the border of the interfemoral membrane. Fur very soft, being smoky black above, under surfaces paler.

Average measurements:—

Head and body	..	..	70 mm.
Tail	..	..	45 mm.
Fore arm	..	..	50 mm.

Reference—Dobson, B.M. Catalogue *Chiroptera*, p. 425 (1878).

The range of the Plicated Bat is from India, through the Malay Peninsula to Tasmania. The muzzle of this species projects considerably beyond the lower jaw. The ears are large, and are united by a band in front.

## OSTEOLOGY.

Although the osteology of our bats has been worked out for the purpose of classification, and published in technical monographs, there is much interesting matter awaiting investigation. Lovers of natural history living in the country might assist the Museum collections by sending in specimens of these little creatures as they meet them in the bush rambles. Not only the skulls, but the skeletons generally are full of interesting material, and we hope that this appeal for specimens may not be made in vain.

## EXTINCT MAMMALS.

Up to the year 1910 it was believed that Tasmania had been separated from the mainland of Australia during the Pleistocene Period—that age of gigantic marsupial mammals! To-day we know that so far from that being true, we shared in the honour of giving habitats to the following giants:—

1. The gigantic Kangaroo—*Palorchestes*.
2. Certainly three lesser giants, belonging to the same family.
3. The giant Wombat.
4. The, as yet, imperfectly known *Sthenurus*.
5. The giant Anteater.
6. At least three species of *Nototheria* in various stages of evolution, and the very large chapter of natural history relating to these mighty marsupials may be recapitulated in the following way:—

What the *Titanotheres* were to America, the *Nototheres* were to the Australian Zoogeographical province, except that the latter were marsupials and the former were not. Beginning with the form and habits of Tapirs our *Nototheria* were evolving into marsupial rhinoceroses, and one species—*Nototherium mitchelli*, had reached a horned stage comparable to that manifested to-day by the Indian Rhinoceros. Other forms were just attaining the fighting weapon, and in this respect compare with the stage reached by the modern Chittagong Rhinoceros. Some were apparently strictly Tapir-like in habits, but much has yet to be discovered before we can write the whole story. We hope to yet discover in Tasmania the quaint *Euryzgoma* that Mr. Heber Longman has restored from the Pleistocene formations of Queensland, an animal whose face was wider than his head was long, and whose cheeks carried pouches for storing food supplies.



## THE ABORIGINES OF TASMANIA.

In view of the general nature of this work it has been resolved to include a short general note on the Aborigines. There are several reasons for this. The Tasmanian aboriginal man (*Homo tasmanianus*) is, of course, included in the *Primates* class of the *Vertebrata*, and the scientific importance attached to the race is one of increasing interest. Further, the general characteristics of the race are not very well known as a general rule, and this is not as it should be.

Before proceeding with the strictly ethnological portion of this short note on the general characteristics of the Aborigines it may be as well to refer very briefly to the chronological sequence of the early exploration and discovery of pre-settlement days.

Tasmania was discovered by Tasman in 1642. Marion du Fresne followed in 1772, and it was he who had the first, and, sad to say, unfortunate encounter with the aborigines. Then followed Furneaux (1773), Cook (1777), Bligh (1788 and 1792), D'Entrecasteaux (1792 and 1793), Hayes (1793). Flinders and Bass carried out the circumnavigation of Tasmania in 1798-99, and proved the existence of Bass Straits, and the visit of the French Admiral Baudin in 1802 was the indirect cause of the first settlement at the Derwent in September, 1803. \*

The details concerning the aborigines which were gathered by the early navigators were very meagre, and owing to the rapid extermination of the race and the few authentic facts which were recorded by the early settlers our knowledge of the former aboriginal inhabitants of our island is by no means as complete as it should be. x

The Tasmanian race belonged to one of the most primitive of races, which continued their customs down to within recent times. A little over a hundred years ago *Homo tasmanianus* wandered through the Eucalypts of this Southern isle, his sole weapons being the spear, the waddy, and the various chipped stone implements which he laboriously manufactured.

Owing to the formation of Bass Straits the Tasmanian aborigines were isolated, left perhaps as survivors of the original race which roamed over Australia. Owing to the Straits, they were unaffected by the migrations of the more virile races from the North, who evidently swarmed into Australia, introducing an advanced stage of "culture"—and the dingo. The Tasmanians remained unaffected by the changes on the mainland, and were unaware of the advantages of fixing a handle to their stone axes or of the use of a spear thrower.

With the advent of the white race all was changed, and it was not many years before the remnants of the race were gathered together in exile, and quickly died out. So little interest was taken in the aborigines that the only authentic weapons possessed—apart from the stone implements—by the Tasmanian Museum, are seven spears and three waddies. The osteological relics are more numerous, and the Tasmanian Museum now possesses by far the largest single collection in the world, recent purchases and discoveries having been the means of considerably enlarging this branch of the National collection.

Owing to the meagre authentic details which are available, it is exceedingly difficult in many cases to arrive at definite conclusions, but the following synopsis should serve the purpose of giving an outline idea, at least, of one of the most interesting of native races, and one whose ultimate fate was sad in the extreme.

\* For further details of the early discoveries see "The Early Explorers of Tasmania," by Clive Lord, and the references there given.

x For details concerning the aborigines see "The Aborigines of Tasmania," by Ling Roth (2nd Ed.).

Number—The native population at the time of the first settlement has been variously estimated by different writers, the estimates varying from 500 (Walker) to 20,000 (Melville).

Tribes—Apparently there were several tribes, the main being—

- (1) Southern Tribe, including Bruny Island, etc.
- (2) Western Tribes, including the tribes inhabiting the West and North-West Coasts. Further research work among the extensive "Kitchen middens" of the West Coast might provide interesting data.
- (3) Central Tribes, including such famous tribes as the Oyster Bay and Big River Tribes.
- (4) North-East Tribes, including the Ben Lomond Tribe.

Colour—Blackish, the head, etc., often smeared with red ochre.

Hair—Woolly.

Dress, etc.—The natives in their primitive state seldom wore any covering. Occasionally a kangaroo skin across the shoulders, or a few strands of kangaroo sinew or other ornament around the neck was worn. Sometimes shell necklaces such as are still manufactured by the quadroon descendants of the race who inhabit the Straits Islands, were made.

Skin markings—The aborigines ornamented their bodies by cutting them in order to raise scars.

Circumcision—As far as can be ascertained the aborigines did not practise circumcision.

Food—The native lived largely on the native marsupials and shell fish. He would not eat scaled fish.

Cannibalism—As it is sometimes stated that the Tasmanian aboriginals were cannibals, it is worth noting that there is not the slightest authority for this assumption. Among other statements we may note that of Calder:—"They were great flesh eaters, but not cannibals, and never were. Some of them, being incautiously asked if they ever indulged in this practice, expressed great horror at it. They never named the dead, and certainly never ate them."

Fire—It appears doubtful if the aborigines were conversant with the means of obtaining fire before the advent of the early settlers. There are some accounts which go to show that they knew how to produce fire by means of a stick and groove. The only certain fact we know is that the natives usually carried fire as they went, and by setting light to the bush, etc., there was usually fire within reasonable distance of their camps.

Habitations—Their huts were usually rough breakwinds, but there is some evidence that the West Coast tribes built more substantial residences. The aborigines were nomadic, and moved from district to district in search of food.

Spears—The spears were long and tapered, the length being from ten to fifteen feet. The use of the spear thrower was unknown to the Tasmanian.

Waddies—The waddy was a short, thick stick about two feet six inches long. It was also used as a throwing stick. (The Tasmanians, of course, did not use the Boomerang.)

Stone Implements—The chipped stone implements were used for a variety of purposes. They ranged in size from small flakes of a few millimetres in length to large "axes" of several pounds weight. Many specimens can still be found in various localities.

**Bags**—The aborigines made rough bags of grass and reeds, in which they carried shell fish, etc. Many of the bags in the Museum collections were made by the aborigines long after their contact with the white race, and as a true example of aboriginal workmanship, the value is doubtful. They also made drinking vessels from kelp leaves.

**Burial customs**—In most instances the aborigines appear to have burned their dead, often preserving portions of the bones, apparently as a charm, as these were worn suspended round the neck.

We have some evidence, however, that on occasions bodies were buried. We have recently exhumed the remains of several aborigines from sand dunes, etc., and all were buried in the same peculiar manner.

**Fishing**—The aborigines did not use fish hooks or nets. In fact, they would not eat scale fish. Crayfish, etc., were secured by the women, who were experts at diving for these crustaceans amid the kelp.

**Boats**—The canoes of the aborigines are usually described as rough bundles of bark. It is known, however, that the natives visited islands several miles from the coast, and the following account, taken from Lieut. Jeffrey's book on Van Diemen's Land (1820), is of interest:—"Their canoes have hitherto been very inaccurately, if at all described; but, in fact, they do not appear to have very frequent use for these vessels, as they but seldom visit the coast, and chiefly confine themselves to hunting. When, however, in their excursions, which in the autumn are supposed to be from W. to E., and in the spring from E. to W., they come to an arm of the sea, a large river, or a lake, and make canoes from the adjoining woods. These when formed are not unlike a catamaran, and are sufficiently large to support from six to ten persons in crossing the largest rivers. These canoes are formed by the trunks of two trees about thirty feet long, and laid in a parallel direction, at a distance of five or six feet from each other, and are kept in that position by four or five lesser pieces of wood fastened at each end by slip of tough bark. In the middle is a cross timber of considerable thickness, and the whole interwoven with a kind of wicker-work. This flat and completely open canoe, or rather float, is made to skim along the surface of the water, by means of paddles, with amazing rapidity and safety. The natives are frequently seen on them near the southern mouth of the Derwent, between Isle Brune and the main, where the canoes are often found, deserted by their owners after they have answered the immediate purpose for which they were constructed."

# OUTLINE TABLE OF GEOLOGICAL SUCCESSION

		As recognised in Tasmania.	Tasmanian Examples.
Post-Tertiary or Quaternary (The Age of Man)	Recent	Recent	Native shell mounds, etc. River alluvials. Glacial deposits.
	Pleistocene	Pleistocene	Remains of Giant Marsupials. such as <i>Nototherium</i> .
Tertiary or Cainozoic (The Age of Mammals)	Pliocene {	Upper Tertiary	The Tertiary formations in Tasmania have yielded fossils of Early Marine Mammals re- lated to Whales as well as the marsupial <i>Wynyardia</i> . Outpourings of basaltic lavas. Launceston Tertiary basin. Wynyard fossil beds.
	Miocene {		
	Oligocene {	Lower Tertiary	
	Eocene {		
Secondary or Mezozoic (The Age of Reptiles)	Cretaceous	Cretaceous	In Tasmania the Mesozoic rocks show evidence of rich forms of plant life, and also Labyrinthodonts and fossil fishes.
	Jurassic	Trias-Jura	Cretaceous times probably witnessed the main diabase intrusions.
	Triassic		Trias-Jura represented by such formations as the Upper Coal Measures or Fingal Series.
Primary or Palæozoic (The Age of Fishes)	Permian Carboniferous {	Permo- Carboniferous	The Permo - Carboniferous rocks are rich in numerous fossil mollusca and sea ani- mals generally.
	Devonian	Devonian	Most of the Granite rocks in Tasmania irrupted in Devon- ian period.
	Silurian	Silurian	The Silurian formation yields <i>Orthoceras</i> , Corals, etc.
	Ordovician	{ Cambro- Ordovician	Cambrian represented by <i>Dikelocephalus</i> , etc.
	Cambrian		Caroline Creek trilobites rep- resent earliest recognisable re- cord of life in Tasmania.
Pre-Cambrian	Proterozoic Archæan	Proterozoic Archæan (?)	Pre-Cambrian rocks occur in Western Tasmania.

## GLOSSARY

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(In order to assist the student of Zoology as much as possible, we have included the following Glossary, as many Tasmanian students have not means of reference at their disposal.)

**Abaxial.**—Away from the axis.

**Abdomen.**—The part of the body containing the digestive organs.

**Abductor.**—A muscle which serves to draw a part out or away from the median line of the body.

**Aberrant.**—Deviating from the ordinary type.

**Accelerator.**—A muscle which serves to hasten the rate of action.

**Accretion.**—External growth.

**Acetabulum.**—The socket which receives the head of the thigh bone or femur.

**Acromion.**—The outer extremity of the shoulder blade.

**Adductor.**—A muscle which serves to draw one part towards another.

**Aggregate.**—Collected in a mass.

**Albino.**—White, suffering from lack of colouring pigment.

**Alisphenoid.**—A bone in the base of the skull, a portion of the sphenoid; in fact, wing-like extension.

**Alluvial.**—Accumulations brought together by moving waters.

**Alveol.**—The teeth sockets of the maxillary bones.

**Ambidextrous.**—Being able to use both hands with equal ease.

**Amphibious.**—Being able to live either on land or in the water.

**Amphicelous.**—Concave on both surfaces.

**Analogue**—A structure is the analogue of another when it is similar in function to it, but of different origin. Also an animal is the analogue of another in a similar way. The *Nototherium* is the analogue of the *Rhinoceros* and the *Titanotherium*.

**Anatomy.**—The science which treats of the structure of organic bodies.

**Ankylose.**—To blend into a solid whole, as the blending of two bones by an out-pouring of ossific matter or other union.

**Antebrachium.**—The fore arm.

**Anthropology.**—The science of man.

**Appendage.**—A part attached to the main trunk.

**Aquatic.**—Relating to water.

**Archæan.**—The lowest (= oldest) period in the table of geological succession.

**Archæopteryx.**—A primitive lizard-bird of the Jurassic period.

**Astragalus.**—The large ankle bone.

**Asymmetrical.**—Without symmetry. Having two sides unlike.

**Atavism.**—Reversion to the original form.

**Atlas.**—The first cervical vertebra articulating with, and supporting the globe of the head. So Atlas held up the world!

**Atrophy.**—To waste away.

**Auditory.**—Relating to the hearing organs.

**Axial.**—Relating to the axis or stem.

**Axis.**—(1) The second cervical vertebra. (2) The median line.

**Baleen.**—Whalebone, or more fully the plates of bone in the mouth used as strainers

- Basihyal.**—The central median portion of the hyoid arch. In whales a compound bone built up from a small basihyal, and two thyrohyals, thus forming a moon-shaped bone.
- Basioccipital.**—The median bone at the base of the back of the cranium, and extending beneath the occipital condyles.
- Basisphenoid.**—A bone of the cranium situated near the basioccipital, but carried forward in the middle line.
- Batrachian.**—Relating to frogs, etc.
- Benthos.**—Aquatic animals which remain fixed to rocks, etc.
- Biceps.**—A double-headed muscle.
- Bicollateral.**—With similar sides.
- Bicornute.**—Having two horns.
- Bicuspid.**—(1) Having two points. (2) A premolar tooth.
- Bioyomics.**—The relation of an organism to its environment.
- Brontosaurus.**—A giant land reptile (extinct).
- Bulla.**—The prominence below the opening of the ear, that in many mammals is swollen up into a bubble—hence the name.
- Bunodont.**—Having molar teeth with low conical cusps. The large molar of a pig will illustrate the point.
- Cachelot.**—The sperm whale
- Cainozoic.**—The geological era from Mesozoic to Recent times. Also Tertiary (the age of mammals).
- Calcaneum.**—The heel. A large bone in the tarsus.
- Calciferous.**—Containing lime.
- Callosities.**—Hardened and thickened areas on the skin.
- Calvarium.**—The upper part of the skull.
- Cambrian.**—The lowest division of the Primary or Palæozoic Period.
- Canine.**—The tooth next to the incisors.
- Capitulum.**—A knob-like swelling at the head of a bone, mostly used in connection with ribs.
- Carboniferous.**—In Tasmania grouped with the Permian (the highest division of the Primary Period). The dual system known as Permo-Carboniferous.
- Carinatæ.**—An order of birds which have a keel-shaped breastbone.
- Carinate.**—Ridged or keeled.
- Carnivorous.**—Flesh eating.
- Carpus.**—The wrist.
- Cauda.**—The tail.
- Caudal.**—Relating to the tail or posterior extremity.
- Cell.**—(1) A hollow or cavity. (2) A unit mass of protoplasm.
- Centrum.**—The main body of the vertebra from which the neural and hæmal arches rise.
- Cephalic.**—Relating to the head.
- Cervical.**—Relating to the neck.
- Cetacea.**—Whales (including Dolphins, etc.).
- Chevron.**—V-shaped bones articulating with the ventral surface of the caudal series. A protection for important blood vessels.
- Cingulum.**—(1) A ridge round crown of a tooth. (2) Any structure like a girdle.
- Clavicle.**—The bone forming the anterior portion of the shoulder girdle, the "collar bone" of popular parlance.
- Coccyx.**—The portion of the vertebral column beyond the sacrum.

**Condyle.**—The prominent process on the skull which connects with the neck bones. Also the articulating knob of the long bones. (Note. — Mammals have two condyles, whereas Reptiles and birds have but one.)

**Corniculate.**—Possessing horns.

**Coprolites.**—Portions of fossilised excrement.

**Cranium.**—The skull.

**Crepuscular.**—Flying before sunrise or in twilight.

**Ctenoid scales.** (Of fish.) Scales with comb-like edges.

**Cretaneous.**—Relating to the skin.

**Dactyl.**—A finger.

**Cutaneous.**—Relating to the skin.

**Diastema.**—A space in a jaw without teeth, well seen in horses.

**Didactyl.**—With two toes or fingers.

**Dipnoi.**—A group of primitive fishes.

**Diprotodont.**—Having the first two incisors large and prominent, the rest of the incisors or canines being small or absent.

**Distribution.**—The range of a group or species in the Zoogeographical realm.

**Diurnal.**—Active in the day time.

**Distal.**—The end of a bone most removed from the main structure the opposite of proximal. Thus the distal end of the femur is its point of articulation with the bones of the lower leg, while the proximal end of the femur is its head.

**Dorsal.**—Relating to the back.

**Egg tooth.**—A small horny structure on the tip of the bill with which the embryo breaks through the egg.

**Embryo.**—Any young organism in the early stages of its development.

**Embryology.**—The branch of Science dealing with the study of the changes undergone by animals in their development from the egg to the adult condition.

**Enamel.**—The hardest of the three main substances that form the structure of teeth, namely, dentine, enamel, cementum.

**Eocene.**—The geological period that is supposed to have witnessed the dawn of higher mammalian life. The lowest section of the Tertiary or Cainozoic.

**Eoliths.**—Pieces of flint or stone chipped by early man.

**Epidermis.**—The outer layer of the skin.

**Epipleural.**—Actually—upon the ribs—namely, those bony processes in birds' ribs that guide the ribs during respiration. Also called "Uncinate processes."

**Epipubic.**—Relating to the pubis—especially the "Marsupial bones" of the *Marsupialia*.

**Episternum.**—The interclavicle.

**Epiphysis.**—The disc or terminal parts of bones, left open to allow for growth.

**Ethiopian.**—An African.

**Ethmoid.**—The bones that relate to the sense of smell, as a rule made to include various distinct moieties—the homologies of which might well merit revision.

**Ethnology.**—The science of various races of men.

**Ethology.**—See Bionomics.

**Exoccipital.**—Relating to the bone on either side of the foramen magnum.

- False ribs.—Those bones of the chest that are not immediately attached to the breast bone—in man five pairs.
- Fang.—Any highly developed canine tooth.
- Fauna.—The animals of a country.
- Female.—An egg producing or young producing animal. Symbol ♀ (Venus' girdle)
- Femur.—The thigh bone.
- Fibula.—The smaller of the two bones of the lower part of the leg.
- Fish lizards.—Tehthosauria.
- Floating ribs.—Those ribs that carry no cartilaginous extensions, but remain quite free.
- Fœtus.—An embryo in the egg or in the uterus.
- Foramen.—Any small opening in the tissues of a bone to pass nerves and blood vessels through.
- Foramen magnum.—The large aperture at the base of the skull.
- Fossa.—An excavation in a bone or a cavity caused by the incurving of several bones.
- Fossorial.—Adapted for digging.
- Gape.—The distance between the open jaws.
- Geology.—The science of earth building.
- Gestation.—Generally used as the period over which the female carries her young.
- Gizzard.—The hard, muscular bag in which birds roll their food, aided usually by stones and grit.
- Glands.—Most commonly used for secreting ducts, but ductless glands also exist.
- Glenoid.—The socket in the skull in which the lower jaw works, also the socket of shoulder bone.
- Gomphosis.—A fixed articulation—as a tooth in its socket.
- Hæmal.—Relating to the blood vessels. The lower parts.
- Hallux.—The first digit of the hind limb, the great toe.
- Heterocercal.—Having the vertebral column terminating in the upper lobe of the tail.
- Heterodont.—Having the teeth differentiated for various purposes.
- Histology.—The branch of science dealing with the minute structures of various bodies.
- Holorhinal.—With intimately associated, and therefore perfect nose bones.
- Homocercal.—Having a tail with nearly equal lobes.
- Homodont.—Having the teeth all alike.
- Homologue.—A structure is said to be a homologue when its source is the same as that with which it is compared. A bird's wing is the homologue of a man's arm. (See by contrast analogue.)
- Homologous.—Similar in structure.
- Homoplasmy.—Animals or structures not derived from a common source, that have, however—as the result of their evolution—simulated each other.
- Humerus.—The upper arm bone.
- Hybrid.—A cross-bred animal (or plant).
- Hyoid.—The tongue bones.
- Ilium.—One of the two haunch bones.
- Indigenous.—Native (not imported) to a locality.
- Innominate bone.—A wide term used to cover the bones of the pelvis.



**Insectivorous.**—Insect eating.

**Insectivora.**—A group of animals which feed upon insects, worms, etc.

**Integument.**—A covering layer.

**Interclavicle.**—A bone found in lizards and Monotremes as a functional item of the scapular girdle, but reduced to processes in birds, and practically lost in higher vertebrates.

**Interparietal.**—A vestige only, now remains of this ancient skull bone. It appears, however, in the marsupial skull, particularly in early life.

**Interspinal.**—The pads of cartilage that connect the several vertebræ may be called interspinal elements.

**Invertebrate.**—Without a spinal column.

**Jaw.**—The term usually covers the more technical term "mandible," but is often used in a loose way to indicate either a right or left ramus of the mandible.

**Jugal.**—The face arch is often called the jugal arch—its restricted use is to retain it as a substitute for the Malar.

**Karyocinesis.**—The change undergone by the activities of nuclear bodies.

**Knee.**—On man, the union of femur with the tibia and fibula together, with the covering plate of bone called the patella. The popular term knee applied to horses is quite incorrect, since a horse's front limbs are really his arms.

**Labyrinthodont.**—Extinct reptiles of the Carboniferous and Permian periods, the infolding of the enamel of whose teeth suggested the name.

**Lachrymal.**—The bone near the eye that lodges and gives exit to the lachrymal duct.

**Lophodont.**—Molar teeth, the tubercles of which form transverse ridges.

**Lumbar.**—The third series of vertebræ, counting backwards from the skull, namely—(1) Cervicals, (2) dorsals, (3) lumbar.

**Lung.**—In essence, the evolved swim bladder of the fish—altered in land vertebrates to an elaborate net work.

**Macerate.**—The act of slowly rotting away tissues from to bone or fibre.

**Macrobiotic.**—Long lived.

**Macrocephalic.**—Large headed.

**Malar.**—Also called by some the jugal.

**Male.**—Symbol  $\sigma$  (Mar's arrow).

**Mammæ.**—The milk-secreting organs in mammals.

**Mammal.**—Any animal dependent upon the milk of the mother.

**Mammoth.**—An extinct animal which in size was equal to the elephant of the present day.

**Mandible.**—The lower jaw.

**Manus.**—The hand.

**Marsupial.**—Pouch bearing.

**Mastoid.**—A skull bone in the aural regions.

**Mesial.**—In a middle line.

**Mesozoic.**—The Secondary Geological Period (the Age of Reptiles).

**Moiety.**—One of two equal parts.

**Morphology.**—The branch of science which deals with form and structure.

Nares.—In whales, usually applied to the region of the “blowers” as “narial regions,” “narial basin,” etc.

Nerton.—Strong swimming aquatic animals.

Neolithic.—Man of the newer stone age.

Neural.—Towards the neural regions.

Neural arch.—That part of the vertebræ that passes the medulla or spinal cord.

Nomenclature.—System of naming animals, etc.

Norma.—View of skull.

Occipital.—Relating to the occiput or back of the skull.

Odontoid process.—The peg that prevents dislocation of the neck.

Odontoceti.—The toothed whales.

Ordovician.—The second lowest division of the Primary Division. In Tasmania usually grouped with Cambrian, the dual system being referred to as Cambro-Ordovician.

Ornis.—The birds of a certain district.

Ornithology.—The science of birds.

Os.—A bone.

Osseous.—Bony.

Ossicle.—A small bone.

Osteology.—The science of bones, their description, and identification by comparative methods.

Ovary.—The female reproductive organ.

Ovate.—Egg shaped.

Oviduct.—The tube which carries the eggs from the ovary to the exterior.

Oviparous.—Egg laying (as opposed to viviparous).

Palæoliths.—Chipped stone implements (“ancient stones”).

Palæontology.—The science dealing with the early life of the globe by means of the study of fossils, etc.

Palæozoic.—The Primary or first of the three main divisions of the geological epoch (the age of first life).

Palmate.—Having fore toes webbed.

Parietal.—The bones constituting the side walls of the skull.

Parthenogenesis.—Reproduction by means of cells corresponding to ova developed in organs similar to ovaries, but without impregnation by means of sperms.

Patella.—The knee-cap.

Phylogeny.—The study of the pedigrees of various groups of animals in relation to other groups and extinct forms.

Placenta.—The attachment between the unborn child and the mother.

Plankton.—Small animals which float in water, and are at the will of the currents.

Plantigrade.—Walking with the whole sole of the foot touching the ground.

Pleistocene.—The era of the Post Tertiary Ice Age.

Plicate.—Folded.

Polyprotodont.—With 4 or 5 incisors on each side of the upper jaw.

Prehensile.—Adapted for grasping.

Premaxilla.—The bones forming the anterior part of the face, small in man, but extensive and important in lower animals.

Premolar.—The tooth that goes in front of a true molar.

Prothylacinus.—An extinct animal from the tertiary deposits of South America. Very closely allied to the marsupial wolf of Tasmania.

**Protoplasm.**—The complex chemical substance which constitutes the vital material of all living plants and animals.

**Proximal.**—Said of a bone or its end which is nearest to the skeleton. (See distal.)

**Pterodaactyle.**—Extinct flying reptiles.

**Pterygoid.**—A process of bony base of the skull.

**Quadrate.**—The quadrate bone has a long and wonderful history. It is highly developed in reptiles and birds.

**Quaternary.**—Also Post Tertiary. The geological age, which includes Pleistocene and Recent. (The age of man.)

**Radius.**—One of the arm bones.

**Ramus.**—In a general sense used as one half of the lower jaw, in an extended sense to the coronoid process—as an “ascending ramus,” and the tooth line as a “horizontal ramus.”

**Raptorial.**—Birds of prey.

**Ratitæ.**—An order of birds in which the sternum is flat, and not keeled below.

**Retractor.**—A muscle that draws back.

**Rostrate.**—Beaked.

**Sacral.**—Those vertebræ that are blended together to support the hip bones.

**Sacrum.**—The vertebræ so united.

**Sagittal.**—The jagged articulation of the bones of the skull to form the sagittal crest.

**Schizorhinal.**—Truly—split nose—used in the taxonomy of the avian skull.

**Simiidae.**—The higher apes.

**Sinuate.**—Curved.

**Sinus.**—A depression or dilation.

**Skeleton.**—The hard parts of animals or plants.

**Skin.**—The outer covering.

**Skull.**—The cranium and its appendages.

**Slough.**—The case skin of a snake.

**Sphenoid.**—A skull bone of an exceedingly complex nature, and composed of various moieties.

**Spinous process.**—Projecting parts of a vertebræ.

**Squamosal.**—The bone that covers the sides of the skull.

**Sterile.**—Barren.

**Sternum.**—The breast bone.

**Subcutaneous.**—Under the skin.

**Subovate.**—Somewhat egg shaped.

**Superior.**—Upper.

**Suture.**—Truly, a seam.

**Symphysis.**—The union of bony elements, as those of the pelvis and the separate rami of the jaw.

**Syndesmosis.**—A joint made by binding with cartilaginous or ligamentous elements.

**Talon.**—A claw used in the description of teeth as a “hind” talon, etc.

**Talus.**—The astragalus or ankle bone.

**Tarsus.**—The foot.

**Taxonomic.**—Classification (taxio—I arrange).

**Temporal.**—Relating to the temple, or those skull regions that overlie the squamosal (temporal) bone.

Testes.—Paired male reproductive glands producing spermatozoa.

Third eye.—In many extinct forms the third or central eye appears to have been of considerable size.

Tibia.—The larger of the two bones of the lower leg.

Triassic.—The lower geological division of the Secondary or Mesozoic Period.

Tricuspid.—Three pointed.

Trilophodont.—With three crests.

Trochanter.—The elevation for muscular attachment at the end of, say, the femur.

True ribs.—Ribs which are directly connected with the sternum.

Tubercle.—A lump.

Ulna.—The lower arm and elbow bone.

Umbilical cord.—The cord attaching the young to the mother.

Ungulata.—The order of hoofed mammals.

Ungulate.—Hoofed.

Unicuspid.—Single pointed.

Urine.—A fluid excretion from the kidneys in mammals, a solid or semi-solid excretion in birds and reptiles.

Uterus.—The organ in female mammals in which the embryo develops, or the enlarged portion of the oviduct.

Ventral.—The lower surface.

Venomous.—Poisonous.

Vermiform.—Worm shaped.

Vertebra.—One of the elements that unite together to form the backbone.

Vertebrate.—Possessing a backbone.

Viviparous.—Bringing forth the young alive (as opposed to oviparous).

Web.—The membrane connecting the toes of aquatic birds.

Wisdom teeth.—The last four molar teeth of man.

Wormian bones.—Unclassified bony elements that appear in the skulls of lowly developed human beings. At times their history is obscure, but some are obviously associated with suppressed bones that evolution has crowded out.

Xiphoid.—Sword-shaped, also one part of the breast bone.

Yolk-sac.—The umbilical vessel.

Zone.—A faunal area.

Zoogeography.—The geographical distribution of animals.

Zygodactyl.—Having two toes pointing forward and two backward.

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